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Chief Engineers' Salaries

Substantial Revision of the Scale

THERE has recently been a great deal of discussion on the subject of the remuneration and conditions of employment of the chief engineers of electricity supply undertakings. It has arisen largely because of the many appointments of this kind which have been made during the past two or three years.

The industry is rather peculiar in this respect. To all intents and purposes municipal electricity supply, as a whole, dates from about the beginning of the century and young engineers who were appointed at that time, all of an age, are now reaching retiring age, thus creating many vacancies.

In the course of the years increments have raised the salaries of the older men to levels which many local authorities consider far too high and consequently endeavours have been made to cut the remuneration of their successors as much as possible. This has led to a great deal of friction between the authorities and the representative associations of the engineers as well as to acrimony between engineers themselves, for the depreciated salaries have been accepted by some of their number.

The first attempt to place chief engineers' salaries on some sort of logical basis was in 1920 when the "Walker" scale was agreed between representatives of local authorities and of the chief engineers (through the A.M.E.E.). It was not found possible, however, to persuade all authorities to adopt the scale and it is stated that there were three main reasons given for this. First, that the salaries were too high; secondly, that the scale was not negotiated by a properly constituted and representative body (i.e., a Whitley Council); thirdly, that no differentiation was made between energy generated and "retailed," and that purchased or sold in bulk or to large consumers.

Since 1920 the chief engineers have been endeavouring to secure the formation of a joint committee on Whitley Council lines but it was not until three years ago that this was achieved. Then the constitution was agreed of a National Joint Committee composed of representatives of both parties together with thirteen District Joint Councils corresponding to those already existing for staff engineers and manual workers in the industry.

It became the first duty of the National Committee to examine the original scale in the light of the objections raised and this involved a great deal of labour. Finally the Committee hammered out a revision of the agreement and passed it in draft form to the District Committees for consideration. As a result further revisions were made and on July 9th the new scale was agreed to.

Some details of this appear in this issue. In the first place the "chiefs" have made a concession in that the figures in the original scale are reduced by 10 per cent. It will be seen that full account is now taken of the different kinds of "units" in the assessment of the salary basis; in the case of sales in bulk and to large con-

sumers the valuation is drastically reduced to 30 per cent. and sales to the Central Board to 25 per cent., while for non-generating authorities only 75 per cent. of the purchased energy is taken into account.

It is clear that although much time, thought and ingenuity have been expended in the drawing up of the new scale there are still authorities (and some engineers) who are disinclined to accept it. How many is by no means certain, for "estimates" in letters from correspondents have shown wide discrepancy.

We can only say that if a majority of municipal undertakings and chief engineers (judged by importance and not merely by numbers) are of the opinion that the new scale is an acceptable one those who think otherwise should give further serious consideration to the matter before rejecting it, or (as one correspondent has suggested) forming a new chief engineers' association.

An Outmoded View

WHILE at the head of our "Correspondence" page we disclaim responsibility for correspondents' opinions, we consider that we must emphasise this in the case of the letter from Mr. A. E. Morgan printed in this issue. The views which he expresses must be considered extremely reactionary. He maintains, for instance, that "the primary function of electricity supply is essentially electrical engineering," and he goes on to say that "the demand existed and rapid engineering development has enabled this demand to be met." Surely this was the attitude that handicapped development for so long and one that will be supported by few modern electricity supply engineers.

Load Prediction

There is a great deal to support the contention of Mr. F. G. McDonald in a paper read recently before the South African Institute of Electrical Engineers that an undertaking expands exponentially in accordance with its curve of natural growth, but we would not go so far as he seems to do in suggesting that this is independent of managerial policy. Indeed, many instances in Great Britain might be cited to show the effect of energetic load development in very considerably steepening the curve. Nevertheless the assumption that growth of output is determined by a constant that is a characteristic of the supply area is a simple and convenient one for forecasting loads a few years ahead and is likely to be as accurate as any other, even in normal times.

Square Pegs

IT has been questioned whether skilled men who have been taken from industry for service in the Forces are being employed in work of the kind for which they are specially suited. The Minister of Labour has therefore set up a Committee, under the chairmanship of Sir William Beveridge, to examine the use made in the Navy, Army and Royal Air Force of these men. As a first step Sir William has asked the appropriate trade unions to bring to the Committee's notice any cases where it is thought that members are not being used to the best advantage. In view of the shortage of skilled labour in industry it is perhaps unfortunate that the Committee has no power to secure the release of men from the Forces.

No Trailing Cables

PROBABLY the most striking feature of the installation at the Pinewood Film Studios (the subject of Mr. F. V. Hauser's lecture to the Association of Supervising Electrical Engineers last week) is the use of electric immersion heaters as load levellers, which also assist to provide hot water for heating the buildings. That, however, is a somewhat specialised application. Of more general bearing for industrial applications is the method of feeding the stages from overhead gangways which, as we noted in describing the distribution scheme at the Studios a few years ago, leaves the floors free from trailing cables in spite of the large amount of portable apparatus employed.

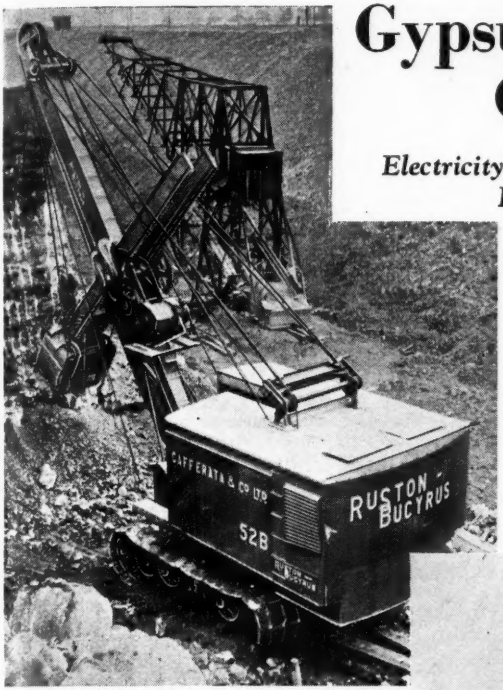
Guns and Butter

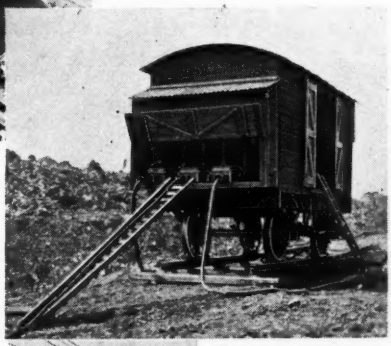
Although greatest stress is properly being laid upon the importance of securing war weapons from the United States, it is pleasing to learn that our friends have also in mind the need for food as well. The Rural Electrification Administration intends to devote a great part of the $100 million which it is empowered to lend during the current year to the stimulation of production of food for the United States and Great Britain. In consequence it is continuing to urge upon farmers the need for purchasing production equipment rather than appliances for the farmhouse itself.

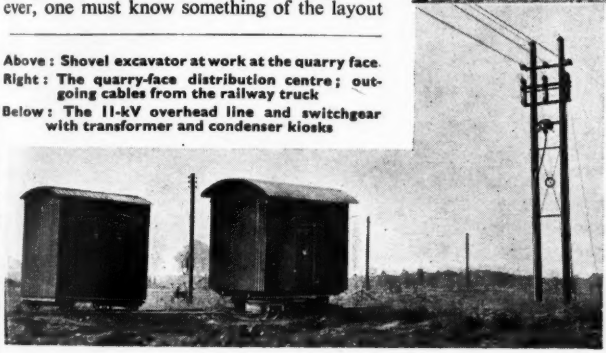
Gypsum Quarrying

Electricity's Part in Large-scale Excavations

The speed of operation at these quarries, the largest in the country, has made necessary special arrangements to ensure flexibility of electricity distribution throughout the extensive working area







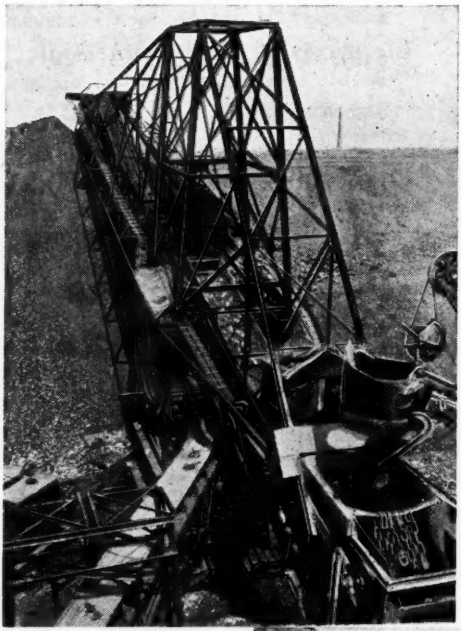
THE gypsum quarries of Cafferata & Co., Ltd., in Nottinghamshire, are the largest in the country. The working area is so large—the main quarry face is half a mile long—and the movement is so fast—30 to 40 yards per week—that special distribution arrangements are necessary to give a high degree of flexibility. To obtain the correct perspective of the distribution scheme, however, one must know something of the layout and work in the quarries, as well as of the electrical applications to the processes, so we will first attempt to give this general picture.

Above: Shovel excavator at work at the quarry face.
Right: The quarry-face distribution centre; outgoing cables from the railway truck
Below: The 11-kV overhead line and switchgear with transformer and condenser kiosks

Actually, there are two main quarries, the ends of which are about 200 yards apart. One is normally associated with the company's adjacent brickworks, also producing brick clay, and

is closed for the period of hostilities. Both the brickworks and the gypsum works are served from the other quarry for the time being.

Both quarries have a common deposit strata of six clearly-defined seams of gypsum, being the residue of sand and clays washed down from the higher ground in past ages. The seams vary in quality, but, generally speaking, the best and oldest material is at the bottom. Midway up the quarry face are the medium quality materials, and the lowest quality rock is at the top.

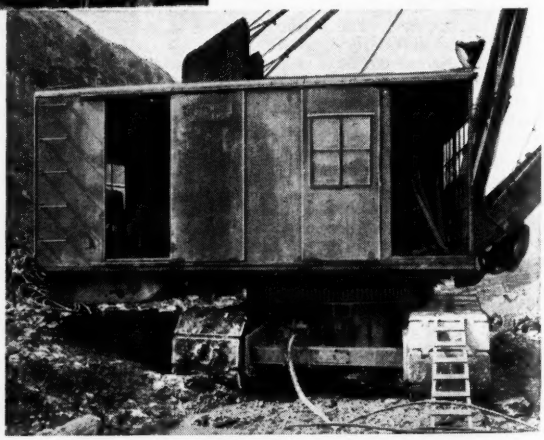


A view of the transporter from the quarry top, showing the hopper receiving from the shovel excavator and the gypsum return conveyor (left front)

The quarry is worked on the bench system in a similar manner to ironstone mining, the bench level being at an average depth of 28 ft. below the surface. This is formed by a 52-B, Ruston-Bucyrus shovel excavator, and the lower portion of the quarry face is excavated by a 52-B dragline of the same make. The quarry face is blasted by means of breast holes, drilled electrically at levels about 2 ft. above the bench and floor of the quarry.

The drills for boring the blast holes are of a special hand-operated type, manufactured by Campbell & Isherwood and are wound for 100-V operation. They drill 2¾-in. dia. holes 30 ft. into the working face in front of the excavators to which reference has already been made. A special section of twist steel is used for the drilling rods, and the cutting bit is of the fishtail pattern. Each hole is charged with about 20 lb. of high explosive, and this is found sufficient to shake the face to enable the excavators to operate. All three charges are detonated electrically and fired simultaneously by a magneto exploder. The large lumps of gypsum weighing over a ton are broken up indi-

varying from 9 in. to 24 in. thick, and lying at a depth between 16 ft. and 36 ft. at the shallow end of the workings, and from 36 ft. to 54 ft. at the deep end. Above this deposit of seams are found self lumps of gypsum at a depth of about 8 ft. to 16 ft. below the surface. A theory put forward by some geologists is that the self lumps are at present undergoing formation at the expense of the bottom seams, which are really deposits left from evaporated seas, the marl in which the gypsum strata lie



The dragline excavator cabin, showing the driving motor and compressor inside the cabin, and the cable lead-in at the front

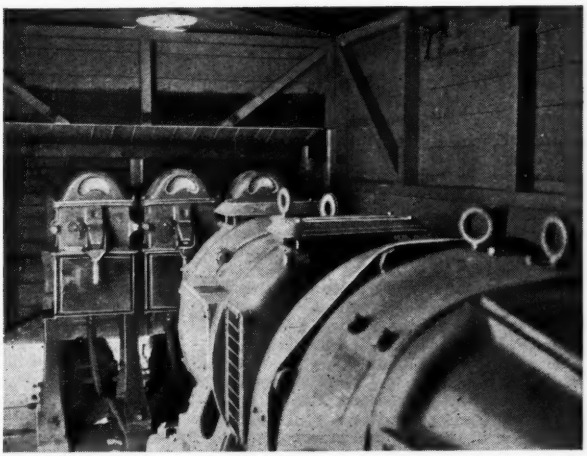
A general view of the quarry plant, showing the dragline excavator (foreground), the transporter and the shovel (rear)

vidually by blasting, for which holes about 6 in. deep and 1¼ in. in diameter are drilled and charged with a few ounces of high explosive.

The supply of power to the excavators is *via* cast-iron spring-loaded shoes situated on top of the carriages of the excavators, and these are in contact with collector rings attached to the underside of the superstructures. The shovel excavator power unit is operated on the Ward-Leonard control system, the motor generator set of which consists of a 100-HP, 3,000-V squirrel-cage direct-on starting B.T.H. motor mounted on a common shaft with three independent 250-V, DC generators, one of 55 kW and two of 20 kW, which supply the hoist, swing and crowd motors respectively.

The hoist motor drives the hoisting drum through reduction gearing and *via* a dog clutch it also serves for the travelling operation of the excavator. The swing motor drives through a bevel reduction gear to the swing motion, and the crowd motor transmits through a spur reduction gear to racks and pinions to the dipper sticks of the bucket, which forces it into the working face of the quarry. The speeds of all these main operation motors vary from practically zero up to about 500 RPM. There is also a small separately-driven exciter for the Ward-Leonard generator set.

The bucket is tipped by means of a small motor controlled *via* a light flexible cable and press-button situated in the operator's cab.

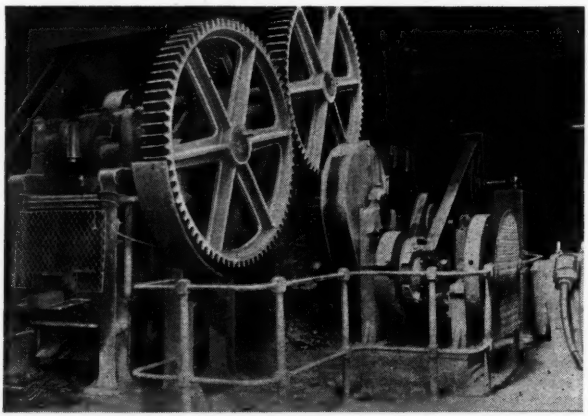


The motor-generator set and 3.3-kV switchboard in the quarry-face distribution centre

The Ruston-Bucyrus dragline excavator already referred to is of the clutch-operated type, the power unit of which is a B.T.H. 100-HP, 3,000-V, 1,450-RPM, constant-speed

squirrel-cage motor supplying power through a series of clutches and reduction gears to the four motions of machine, *i.e.*, hoist, drag, swing and travel. This excavator carries an 85-ft. boom, and a 2¼ cu. yd. bucket. The normal working radius is approximately 50 ft. and the maximum tipping height about 40 ft.

The clutches on this excavator are operated by compressed air, supplied by a small electric motor-driven air compressor mounted on the superstructure of the machine. Small transformers mounted on the excavators provide for the supply to the electric drills *via* three-pin plug and socket units. These drills are used only when the excavators are standing. Incidentally, we learned that very little trouble indeed has been experienced with the 3,000-V systems on the excavators.



The brick-mixing and press plant has a 75-HP drive

The shovel excavator dumps the mixture of clay, marl and self lumps of gypsum into a feeder which serves a series of 4-ft. wide belt conveyors all mounted on a transporter weighing about 180 tons. In the process of conveying the excavated material is handled by a Ross screen on which all the gypsum over 8 in. cube is separated off and returned to the bench on which the excavator stands, where it is loaded into 50-cwt. skips and hoisted to the quarry top to be dumped into rail wagons by a steam crane.

The clay feeder, the three conveyors and the screen on the transporter are all driven by DC motors through reduction gears, the motors being supplied by a motor-generator set at the quarry distribution centre. This arrangement is explained by the fact that the conveyors and screens were originally electrified on DC before the quarry as a whole was converted. The travelling of the transporter is provided for by a 100-HP, 3,000-V B.T.H. squirrel-cage motor transmitting through spur wheel reduction to a countershaft, and then *via* a chain drive to the caterpillar tracks on which the transporter is mounted.

Smalls from the Ross screen pass on to another conveyor with the minus 8 in. gypsum, which is sorted off by hand, the remainder being passed on and deposited on the spoil heap. The top seam of the main deposit of gypsum is generally broken by blast effect into large lumps averaging about a ton in weight. These lumps are picked out of the working face by the shovel, and dumped on to heavy chain nets and brought to the quarry top by the crane for breaking, as previously described, and sorting. They are then re-handled by the crane and dumped into standard-gauge wagons.

The dragline excavator picks out blasted lumps from the face and deposits them on the quarry top for breaking and sorting. It also picks out the best quality marl for brick-making and dumps it on the quarry top, where it is loaded into railway trucks by a small Diesel-driven dragline excavator. The remainder of the unwanted material is dumped by this excavator on to the spoil heap.

The main difficulty in the quarry is to keep the workings free from water, and for this purpose there are three Worthington-Simpson pumps directly coupled to 20-HP motors.

The gypsum at the quarry is sorted off into seven different qualities, the two lowest being manufactured into gypsum products without further treatment. The other qualities are, generally speaking, washed and cleaned. About one-third of the quarry output of gypsum is sent immediately after crushing to Portland cement manufacturers. Another third is crushed and ground ready for marketing as ground mineral, while the remaining third is loaded into railway trucks for dispatch to the calcining plant situated about three miles away.

Marl from the quarry is taken by rail to the brickworks, where it is first dumped into a hopper and fed to an open-base clay mill, driven by a 50-HP "No Lag" motor. The ground clay is conveyed to a silo over the brick press and eventually fed to a double mixer and a pug mill which feeds the mould table on which clots of clay are formed for

feeding later to the brick press which is driven by 75-HP "No Lag" motors.

Auxiliary drives in the brickworks include a 5-HP motor for the crude clay feeder; a 10-HP motor for the conveyor feeding the silo; a 5-HP motor for the automatic stokers on the kiln top; a 5-HP motor for the coal-handling plant, and a similar unit for the forced-draught fan at the kiln.

From the substation at the gypsum works, where duplicate supplies are received from the Derbyshire and Nottinghamshire Electric Power Co. at 11 kV, the consumer has 11-kV and 440-V overhead lines about 400 yds. and 600 yds. long to the quarry proper for the main and pump supplies respectively. The 11-kV line terminates near a portable kiosk substation on rails into which a supply at 3.3 kV is received after transformation in an adjacent portable structure. The incoming unit is an Ellison draw-out type industrial switch, fitted with earth-leakage relays. The breaker serves a two-way disconnecting link box with an outlet to a power-factor correcting condenser at this point, and another outlet to the quarry equipment referred to.

The supply may be "swung out" to any point through a radius of 400 yds. This is effected by a surface-laid 0.03 sq. in., 3-core, paper-insulated, lead-covered, double-wire-armoured cable feeding direct to the quarry distribution centre, which is actually a suitably-equipped railway wagon, The flexibility is aided by arranging the surface cable in four lengths : one of 200 yds., one of 100 yds., and two of 50 yds.

At the other end the surface cable first feeds into an Ellison joint box which serves the busbars of a B.T.H. pedestal units witchboard with three outgoing circuits, two *via* Ellison boxes for feeding the quarry face equipment, and one to a motor generator set which serves the DC auxiliary motors on the transporter.

The motor-generator set consists of a 55-kW, 970-RPM, 220-V generator driven by an 836/970-RPM, 3,000-V squirrel-cage motor with direct coupling. Distribution to the shovel excavator and travelling motor of the transporter is first to a link box on the latter from which a subsidiary circuit is taken to the shovel.

The original private generation equipment is still being run for supplementary supply, and the main unit in the power house is a 125-kW, 220-V Belliss and Morcom steam-engine set. In addition to most of the lighting and small motors in the maintenance workshops, this private generation set also supplies a 75-HP DC motor-driven air compressor.

We are indebted to Cafferata & Co., Ltd., for permission to visit the works, and to Mr. J. P. Macnamara, the quarry manager, for help in collecting the above information.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions

Commercial Professional Staffs' Salaries

MR. FLATT'S letter on the above subject is one which obviously will call for stringent comment from engineers in the electricity supply industry. It appears to be a complaint that members of the technical staffs in the industry who belong to the E.P.E.A. can obtain adequate remuneration, whereas commercial men who enter the industry are unable to obtain similar recognition.

It is apparent that the writer is not an engineer and indeed his letter shows a regrettable lack of knowledge of the true conditions. First, all members of the E.P.E.A. have to obtain a minimum standard of technical ability and the "lack of theoretical qualifications" does not therefore exist, except in the mind of the writer.

Mr. Flatt suggests that "the engineering element in electricity supply is purely ancillary to the main commercial function . . ." this shows a lack of experience of the industry, as the primary function in electricity supply is essentially electrical engineering. That this primary function is recognised by those responsible for paying the remuneration is the real reason for the conditions complained of by Mr. Flatt and is not due to apathy or engineering propaganda among municipal councillors as he suggests.

The remarkable progress which the industry has made in the space of a little over forty years reflects great credit on the energy and guidance of those chief engineers who assumed control when the industry was in its infancy and have brought it to its present state. This progress has been due almost entirely to advancement in the engineering technics of electricity supply; the demand existed and rapid engineering development has enabled this demand to be met.

It is recognised that the business has now assumed such proportions that the introduction of professional commercial men to supervise the accounting side has become necessary, but it must be realised that the function of these commercial men is purely analytical and their job is to present to the engineer an analysis of the financial results obtained. They are not qualified to decide the policy or to assume managerial powers over a commodity the production and distribution of which is outside the scope of their knowledge and training. The fact that their chartered

institute may be older than another does not have any bearing on the matter.

Commercial men are entitled to adequate remuneration which must, of course, bear a relation to the salaries paid to the industry as a whole. It would appear that machinery for this purpose already exists in the National Joint Board.

A. E. MORGAN,
*London, S.W.*14. *B.Sc.Tech., A.M.I.E.E.*

A Standard Vehicle Battery

FOR most of the 23 years I have been in the electric vehicle movement, I have chided battery makers for their lack of enterprise towards cheapening battery cost. Batteries do cost less now, because the low-rate charging which I pioneered ten years ago (against amusing opposition from important battery people) greatly extends their life by preventing overcharging. The standard excuse to-day for expensive vehicle batteries is that as there are so many different sizes, competitive flow production cannot be achieved.

I have worked out a plan by which one size of battery only, made up of cells for which at least six firms already have parts in production, can be used to propel, at speeds up to 25 MPH for distances of 40 to 50 miles per charge, *eight* different sizes of electric vans or lorries. The pay loads are 7 cwt., 10 cwt., 15 cwt., 25 cwt., 35 cwt., 45 cwt., 50 cwt., and 60 cwt.

Notice that 25 MPH is the economical top speed of this new machine, 13 to 15 MPH being an optimistic view of present day speeds, except in special cases where economy is jettisoned. Mr. Edison once said, "When the electric can go just a little faster and further with 25 per cent. lower battery cost, it will drive half the i.c. transport off the road." The new electric does the things he visualised.

As these batteries would all be interchangeable and would provide power for all sizes of electrics commonly in use, makers could increase demand for them by inducing motor traders to stock them ready to sling (in five minutes) into electrics that call, charging approximately 2s. 6d. on the exchange. Regular customers would call every morning to get their power for the day's work. Run-down batteries could be changed anywhere. This charge of 2s. 6d. is a little less than petrol cost for the same relative quantity, as one might say, of available energy.

Special electric service stations could also be set up and help to swell the demand for the standard battery. Battery makers could organise a delivery system of charged and/or serviced batteries (clearing away the discharged or low-capacity ones) amongst these two types of traders, to still further increase demand. Batteries would be very cheap because repetition would have full play.

Electrics without batteries and chargers are far lower in price than the relative i.c. types. With 25 MPH and the increased security as to distance, electrics would bite half way into the usage of commercial vehicles now on the roads—about half a million.

Both electric and petrol vehicles could be converted and so there is a wartime value in the system. It would be for Government Departments to weigh up whether or no 8,000 tons of steel used in a tanker could produce more home transport than if it had been used to make or modernise 8,000 vehicles to run on our own fuel.

H. N. OUTRAM.
Burscough Bridge, Ormskirk.

Reading Matter for the Blind

MUCH could be done to alleviate the affliction of blindness by providing books that could be read with the aid of a photo-electric cell. The method is to print morse-code signs on a strip of paper, carried on a spool like a typewriter ribbon but of larger size, say about 9 to 12 in. diameter. These would be as handy to carry as an ordinary book and quite cheap to print.

In use the paper strip would be run through an instrument containing a photo-electric cell which would translate the printed dots and dashes into sounds. The small print would be magnified by a lens to a suitable size to give a clear result in headphones.

Three rows of morse signs could be printed on the strip, which would be run through one way, then back again and then in the original direction, so that the strip would carry a long supply of matter. An opaque screen would block off the lines not in use. A miniature lamp would give light enough on the morse signs to operate the photo-cell.

The apparatus would be light and portable enough to be carried about and could be used on a railway journey. It would even be possible with a simple typewriter having two keys, one for dot and the other for dash, to typewrite a message on the strip.

Blind people could quickly learn to read the morse code at speed. A weekly newspaper printed on the paper strips could be sold for a shilling or so. Braille books are costly and are too heavy to carry easily, and many blind people never learn to use them. Few people can have a library of braille books and take a volume from the shelf for an hour's reading, as would be possible with the system I suggest.

The apparatus itself would be cheaper than a wireless set. Incidentally one wonders why the braille system has not been supplanted by morse code for finger-tip reading. An instrument might be prepared by an amateur or in one of our colleges, and the benefits which would accrue to the blind would be a great reward for his work.

C. TURNBULL.
Tynemouth, Northumberland.

PERSONAL and SOCIAL

News of Men and Women of the Industry

At a special meeting of Dundee Corporation Electricity Committee the resignation, for health reasons, of **Mr. D. H. Bishop,** general manager and engineer, was announced. Reference to Mr. Bishop's services to the Corporation was made by the Convener, who said that, in his opinion, it was through sheer devotion to duty that the manager had to take this step. Tribute was also paid to Mr. Bishop's work by the Lord Provost and others. The committee agreed that, while not actually working, he should be retained for three months, or until the appointment of his successor. Mr. Bishop, who is a native of Lichfield, Staffordshire, joined the staff in 1901, and was appointed general manager and engineer in 1922.

Dr. H. L. Guy, whose resignation from the position of chief engineer of the Mechanical Department of the Metropolitan-Vickers Electrical Co., Ltd., and director of the Metropolitan-Vickers Electrical Export Co., after over 30 years' service, was announced in our last issue, received his technical education at the Cardiff College of the University of South Wales and Monmouthshire. He was a winner of the Bayliss Prize presented by the Institution of Civil Engineers and was awarded a Royal Research Scholarship and a Whitworth Exhibition. He entered the mechanical engineering side of the Metropolitan-Vickers Electrical Co., Ltd., then the British Westinghouse Co., in 1910, being promoted chief engineer of the Mechanical Department of the company in 1921, and he was made a director of the Metropolitan-Vickers Electrical Export Co. in 1936.

Dr. H. L. Guy

Dr. Guy is an active member of the Institution of Mechanical Engineers ; he has been a member of the North Western Branch Committee since 1926 and was Branch chairman. In 1928 he was elected a member of Council of the Institution and became a vice-president in 1938. He has contributed many papers on technical subjects to this and other engineering bodies.

He has on three occasions been invited to act on the British Delegation to the International Steam Tables Conference and was chairman of the British Committee. He is also chairman of the Power Plant Section of the E.R.A. and a member of the National Physical Laboratory Advisory Committee for Metallurgical and Engineering Research on Materials. He was elected a Fellow of the Royal Society in 1936 and in 1938 was elected to the Council of the Society. The honorary degree of D.Sc. of the University of Wales was conferred on him at Aberystwyth University College in 1939, and in the same year he was awarded the Parsons Memorial medal.

Dr. Guy was selected to act on the Advisory Council on Scientific Research and Technical Development, set up by the Minister of Supply in 1939, and he was recently elected chairman of the Engineering Research Committee of the N.P.L. in succession to the late Sir Nigel Gresley. Also during this year Dr. Guy became an associated member of the Board of Chemical Defences.

Mr. E. H. Berry, A.M.(S.A.).I.E.E., who left England towards the end of 1938 to visit Empire countries for E.L.M.A. has now been appointed lieutenant (electrical), R.N.V.R. and is stationed in South Africa. Before leaving this country he was electrical advisor at the Building Centre for some years.

Mr. J. H. Aston has been appointed chairman of Tube Investments, Ltd., in succession to the late Mr. Arthur Chamberlain. **Mr. I. A. R. Stedeford** has been appointed managing director and **Messrs. P. G. Carew** and **W. Hackett** have been appointed junior assistant managing directors. Mr. Aston has relinquished the appointment of joint managing director.

Mrs. M. L. Matthews, A.I E.E., who has been in charge of the commercial development of the electric tool business of the Consolidated Pneumatic Tool Co., Ltd , has retired after twenty-eight years' service with the company.

Mr. T. V. Lironi, assistant mains engineer with the Wolverhampton Corporation Electricity Department, has been appointed mains superintendent with the Birkenhead Corporation. Before going to Wolverhampton Mr. Lironi had been mains assistant with Eastbourne Corporation and general assistant to the engineer and manager of the Westmorland and District Electricity Supply Co., Ltd. Previous to holding these appointments he served for five years in the Contract Department of Johnson & Phillips, Ltd., and was engaged on contracts for various supply authorities and the C.E.B.

Mr. N. G. Sisson, technical assistant, London Passenger Transport Board, has been awarded the M.B.E. (Civil Division) for devotion to duty during recent air-raids. Mr. Sisson is responsible for the L.P.T.B. surface and sub-surface lines and repair of bomb damage has been carried out under his supervision during intense air-raids.

Obituary

Engineer-Capt. J. F. Shaw.—The death is reported of Engineer-Captain J. Fraser Shaw, R.N. (ret.), who had been in charge of the Fuel Research Station of the Department of Scientific and Industrial Research since its inception.

Mr. G. F. Schreiber.—The death occurred at an Edinburgh nursing home on August 21st of Mr. George Frederick Schreiber, former Inspector-General of Egyptian State Telegraphs.

WILLS.—Mr. D. McDougall, burgh electrical engineer, Greenock, who was killed by enemy action, left £4,220.

Mr. C. J. Brand, a director of the County of London Electric Supply Co., Ltd., and associated companies, left £20,800 (net personalty, £19,435).

Chief Engineers' Salaries

Details of New Agreement

WE have recently published a number of letters from readers on the subject of the salaries and conditions of employment of chief engineers of electricity supply undertakings. In the course of this correspondence mention has been made of a new agreement negotiated between the local authorities concerned and chief electrical engineers through their National Joint Committee.

Although this agreement was signed early in July, we have been unable to give details, as it was thought that publication of these might prejudice the adoption of the agreement by those local authorities who had not already subscribed to it. We have now received the "all clear" and particulars of the agreement are reproduced below.

In drawing up the agreement the various District Joint Committees were consulted. The term "undertaker" is understood to mean a local authority or any joint board or other combination of local authorities which is an authorised undertaker for the purpose of the Electricity Supply Acts; "chief electrical engineer" means an engineer employed by an undertaker, as defined above, and responsible to the local authority for the management of the undertaking and/or the control of the technical staff of the undertaker.

Salaries are to be determined according to a schedule based upon a "unit assessment" which means the combination of the total number of units sold per annum by the undertaker, including bulk supplies, and the number of units generated by the undertaker for the Central Electricity Board and not re-purchased by the undertaker ("grid units").

Calculating "Units Sold"

For the purpose of calculating the units sold undertakings are divided into two classes: A.—Maintaining a generating station with a capacity not less than 25 per cent. of the maximum demand of the undertaking either in commercial service or ready to be put into immediate service; and B.—Receiving a bulk supply and not maintaining a generating station. For both classes the whole of the units generated and sold to others than bulk or large consumers are taken into account, but only 30 per cent. of the units sold in bulk and to large consumers are employed in the calculation. As regards units sold which are purchased in bulk and not re-sold to large consumers or in bulk the percentages taken into account are 85 for class A. and 75 for class B.

A "large consumer" is defined as one who purchases at one point of supply a proportion of the units sold by the undertaking on the following scale: Where the net number of units sold per annum by the undertaker is above 5 million but not more than 10 million a large consumer is one who takes over 1.5 million units; from 10 to 25 million, 2.5 million; from 25 to 50, 3.75 million; from 50 to 75, 4.5 million; from 75 to 125, 5 million; from 125 to 200, 5.5 million; and above 200, 2½ per cent. of the total.

It is provided that where there are special conditions of distribution which make it advantageous to the undertaker to provide a supply at more than one point on the same premises the supply shall be deemed to be given at one point. The net number of units sold means units sold after deducting "exported" bulk supplies. Losses are applied to units generated and purchased pro rata.

"Grid units" are to be assessed at 25 per cent. of their full value.

Concessions to Undertakers

Where the adoption of the agreement involves an initial increase of salary exceeding £100 the undertaker will have the option of paying the increase by annual increments of not less than £100 per annum. This does not apply to any increase due to an annual ascertainment of unit assessment.

Schedule of Salaries

Unit Assessment (millions)	per annum £	Units (millions)	per annum £
1	500	15	1,013
1.25	517	16	1,035
1.5	533	17	1,053
1.75	550	18	1,076
2	567	19	1,094
2.25	583	20	1,116
2.5	600	21	1,134
2.75	616	22	1,157
3	632	23	1,175
3.25	648	24	1,197
3.5	665	25	1,211
3.75	682	26	1,229
4	698	27	1,238
4.25	715	28	1,260
4.5	732	29	1,274
4.75	749	30	1,292
5	765	31	1,305
6	797	32	1,323
7	824	34	1,355
8	855	36	1,391
9	882	38	1,422
10	914	40	1,458
11	932	42	1,490
12	954	44	1,526
13	972	46	1,557
14	995	48	1,593
		50	1,625

For each million	from	51	to	100	inclusive	add	£8·1
" " "		101	"	150	" "		£4·5
" " "		151	"	250	" "		£2·7
" " "		251	"	350	" "		£1·8
" " "		351	"	500	" "		£0·9

Upon the appointment of a chief engineer after the signing of the agreement an undertaker will have the option of paying 85 per cent. of the scheduled salary for one year and 92½ per cent. for the second year, the full amount being payable thereafter.

In the case of the Greater London area (No. 10 District Joint Committee) the salary of the chief electrical engineer will be increased by 5 per cent. on the first £1,000 only. It is provided that where more than the scheduled salary is already being paid there shall be no reduction.

Adjustments of salary are to date from the first day of each financial year, based upon the statistics of the financial year immediately preceding.

Where the unit assessment exceeds 500 millions the chief engineer's salary is to be determined by mutual agreement, disputes being settled by the appropriate District Committee subject to the approval of the National Committee. The latter provision applies to all disputes, any failure to agree being referred to arbitration.

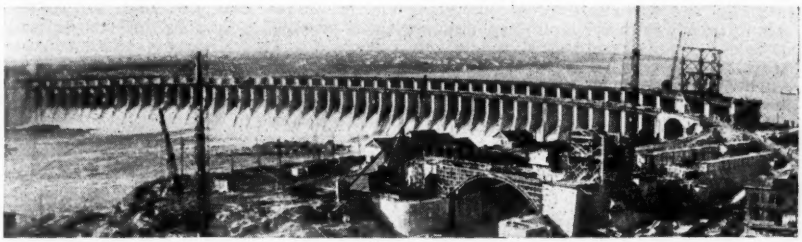
In the case of undertakers who have made appointments conditional upon the salary of the chief engineer rising to the figure agreed by the National Joint Committee the agreement will operate as from the date of signature. Other undertakers shall operate the agreement within three months of the termination of the war, or on such earlier date as shall be determined by the Industrial Court on a reference by the National Joint Committee. Those undertakers who desire to adopt the agreement before this date, however, shall operate it as from the date of adoption.

The agreement is signed by Alderman W. Walker and Mr. L. Romero, chairman and vice-chairman of the National Joint Committee, and by Messrs. A. H. Banks and P. McAlister, hon. secretaries for the local authorities and chief electrical engineers, respectively.

Dnieper Hydro-electric Plant

Russia's Largest Power Scheme

REPORTS of the fighting in the Western Ukraine do not give a very clear picture of the position, but it is evident that the great hydro-electric system on the Dnieper is involved. There have been reports from German and neutral sources that the plant has been destroyed by the Russians themselves, flooding a very extensive area of the surrounding country but so far there has been no mention of this in the Russian communiqués.



The great Dnieper Dam around which intense fighting is taking place

The first stage of the scheme was inaugurated in October, 1932. It was an important feature of the first Five-Year Plan and was designed to form the nucleus of a huge industrial system embracing a large aluminium works, chemical and electro-metallurgical undertakings, and a variety of smaller establishments.

The scheme was prepared by Professor I. G. Alexandrov, and construction was commenced in 1927 under the supervision of Mr. A. V. Winter, with Messrs. Hugh L. Cooper & Co., of New York, as resident consulting engineers. At a point where the Dnieper makes an almost right-angle turn, near the town of Zaporozhye (formerly Alexandrovsk), a single dam was erected to provide a head of 116 ft. with a power house consisting of nine blocks each 72 ft. long.

Nine turbines, each of 85,000 HP, were supplied by the Newport News Co., of America. The weight of each turbine, exclusive of pressure piping and governor, was stated to be 660 tons. Five of the generators (77,500 kVA, 13,800V) were supplied by the General Electric Co., of America; the other four were manufactured at the "Electrosila" Works, Leningrad. The weight of each alternator was given at the time as 780 tons; the rotor with its shaft weighing 430 tons had a diameter of 33.5 ft.; the outside diameter of the stator was 42.6 ft.

Power from the generators was stepped up to 161 kV by an outdoor substation comprising nine banks of three 26,000-kVA single-phase transformers. The substation was in three sections; two of them supplied power direct to the industrial establishments of the system and the third to the Don Basin and other more distant areas.

Testing Chain Links

Detection of Defects by Electrical Conductivity and Resistance

By W. Bayliss

VISUAL examination for the detection of defects in manufactured materials which are electrically conductive and resistive, or magnetic, has severe limitations. Alternative methods are (1) magnetic, (2) Sperry and (3) static charging.

The magnetic method, of which there appears to be two variations, also has disabilities, since one of the processes seems to be confined to the detection of longitudinal cracks only, while the other may be deficient when dealing with bulky or awkward shapes which are difficult to magnetise. There is also the question of demagnetisation, which further decreases the range, but, nevertheless, the magnetic methods are exceedingly useful and practical.

The static charging method, which appears to have been relatively overlooked, may be capable of wider range than either the magnetic or the Sperry method. Experiments are being carried out within the limitations imposed by the war in obtaining the necessary full equipment of instruments and tackle, and data have been accumulated, especially on the rate of static discharge and the means of accomplishing this. The rate of charge is also important, as it depends upon the structural conductivity and homogeneity of the subject to be treated. Although nothing much has been written on this method, it shows great promise.

By the elimination of the chance of latent defects a notable contribution is made to reducing the number of industrial accidents

The Sperry Method

Kehl, in his "Metallurgical Laboratory Practice" (1939), states that "the Sperry electrical test is designed primarily for the detection of fatigue cracks, transverse fissures, and other defects in rails." Tests appear to be sometimes confusing, as not only are dangerous defects recorded, but minor defects also, such as wheel burns and other structural change in the rails caused by working conditions. A large current is passed longitudinally through the rail, and wherever internal defects and inhomogeneities are present a change of potential drop appears. Changes in the transverse magnetic field due to current variations are detected by a coil carried over the rail (see ELECTRICAL REVIEW, November 22nd, 1940, p. 61).

This method depends upon voltage drop, but is more sensitive than measuring resistance between two points, because that relies upon perfect contacts with the test object, which is difficult to repeat, and variation in cross section naturally "jogs" the meter. These difficulties do not seem to prevent the method being applied to good contact subjects.

The writer has been concerned with the manufacture of chains and chain cables for over forty years, and is alive to the possibilities opened up by the foregoing methods of detecting defects, especially latent defects, which may be present in many links in a chain. Now that the Sperry test has shown what can be done with rails, modification may reveal the weakest links in a chain. Their removal (as one link is only relatively weak to another, and all links are weak in this sense) will make the whole chain very much stronger and therefore more reliable. The factor of safety can be reduced, the size and weight of ships' cables decreased, saving dead-weight, and in many ways considerable savings in the current requirements of shipbuilding and replacements can be effected.

It is better to measure conductivity than resistance because of the greater "jog," but if the weakest links are known and marked, it is easy to decide which links can be taken out and which shall remain. In small sizes, links that do not cause too distinct a "jog" do not break their welds, but pull out the material into a stiff bar before breaking, so that a standard of "jog limit" will have to be determined which will also indicate which links will have to be removed.

Accessibility of Welds

Visual examination will not detect a link with a bad latent defect, which is easily detected by the electrical method. Side-welded chains are a better subject for the application of this test because the welds are easier of access to the contacts than is the case with end-welded chains. The whole link, or simply the weld area, can be made the subject of the test and thereafter the whole chain, but there would have to be insulator bridges between each link, put into light tension with the whole chain. In the case of a side weld, where the contacts can be attached to each side of the weld on one side of the link, such insulation does not appear to be necessary.

Wrought iron is not so homogeneous as

wrought steel, and the different makes of wrought iron vary in homogeneity, so that chains made from iron are not such good subjects for these tests as are steel chains.

Chains made from cast steel are liable to great variations in homogeneity, so that different standards of voltage "jogs" will have to be fixed in the three different classes of chain cables made from wrought iron, wrought steel and cast steel. Inhomogeneity also affects weld formation, but is ascertained when the weld is tested, and can be considered with, and in relation to, the quality of the weld.

Bulky and heavy forms of material which cannot be put in circuit can be statically charged on the Wimshurst principle, and so cover the whole field of detection of surface and latent defects, cutting out the fallibility of the human element and the limitations of visual examination, even with microscopic aid. Latent defects cause more accidents than anything else in peace-time affairs.

Although the Sperry system is only used in America for the detection of defects in rails, there is no doubt that it is capable of wide modifications and applications.

Central American Trade

Prospects Now and After the War

By a South American Correspondent

IN the issue of the ELECTRICAL REVIEW of August 1st, British trade prospects with Brazil were reviewed; the present article deals with the Central American countries which are naturally linked with Brazil inasmuch as coffee is the staple support of their economy.

This group of countries embraces Colombia and Venezuela, as well as the Central American Republics of Guatemala, Nicaragua and El Salvador, and, although Ecuador may be added, that country is dependent more upon the international cocoa market rather than coffee. The small republics of Guatemala, Nicaragua and El Salvador are entirely dependent upon the United States market for coffee, so that North American economic influence is supreme, strengthened by the very efficient air transport lines which run from North America down through Central America to the principal points of South America, as also the Pan-American highway now under construction.

Although the United States occupies a predominant position in these markets the author considers that there are useful openings for British producers

Both Colombia and Venezuela, however, are enormous states possessed of vast natural resources which ultimately must make them less dependent upon coffee. At present, farming and mining are the two principal industries of both countries, with relatively few local manufacturing industries, although electric power and light are available in most important centres. On the basis of securities quoted on the London Stock Exchange alone, the total British capital invested in Colombia is £5,600,000 sterling and in Venezuela £18,900,000.

Colombia has an estimated area of some 462,000 square miles, and the mountainous country, combined with very fertile valleys, indicates that transport and heavy electrical equipment, and mining machinery, should contribute largely to the country's future development. The population is nearly 9,000,000, a figure which is only exceeded in South America by Argentina and Brazil. The Government is both enlightened and stable, and there is a general desire to trade with Britain, as well as sympathy in the present war. However, trade with the United States has been assisted by credits granted by Washington, as also by the fact that, with the loss of the German market, the United States is now the only important market remaining open for coffee.

Illustrating the effect of the war, Colombia's exports fell to 166,386,000 pesos in 1940 (of which 74,023,000 pesos represented coffee shipments) from 177,054,000 pesos in 1939, whilst imports contracted to 148,192,000 pesos from 183,442,000 pesos. Imports from the United States in 1940, however, rose to 110,000,000 pesos from 99,000,000 pesos in 1939, but those from Great Britain fell to 12,500,000 pesos from 17,400,000 pesos, and those from Germany dwindled to only 957,000 pesos from 23,443,000 pesos. It is obvious, therefore, that the United States is largely capturing the former very important German trade, but that, despite wartime difficulties, Britain should endeavour to lay the basis for post-war trade.

German competition (now eliminated) was at its height in 1938. In that year, imports of electrical material from the United Kingdom were negligible. Imports of electric motors,

generators and transformers, totalled in value 1,416,431 pesos, of which goods worth 839,000 pesos were sent from the United States, and 289,552 pesos from Germany. Imports of wireless apparatus and accessories totalled 1,866,554 pesos (1,200,933 pesos from the United States and 270,499 pesos from Germany); and imports of batteries and accumulators were valued at 677,404 pesos (United States, 653,776 pesos; Germany 16,424 pesos).

Total values of other electrical imports in 1938 (also almost entirely from the United States and Germany) were as follows:—Telegraph and telephone apparatus and accessories, 487,462 pesos; electric refrigerators, 724,291 pesos; small electrical domestic appliances, 251,964 pesos; electric lamps, 416,857 pesos; portable electric lamps, 181,228 pesos; electricity meters, 173,546 pesos; X-ray and other electrical apparatus for medical use, 156,203 pesos; sundry electrical material 826,835 pesos.

Colombia's Improved Economic Position

The crisis facing Colombia last year when the German coffee market was closed has been surmounted by two factors, first, the very sharp rise in prices and the United States demand for coffee following the Pan-American Coffee Agreement, and secondly, by the adoption of a comprehensive economic plan, designed to assist agriculture and industry, and also important plans for public works, including new railways and highways. Because of the much larger dollar income from coffee sales, the delays and difficulties in providing exchange cover for imports, especially from the sterling area, have now disappeared, and the present position is detailed in a later paragraph. The new economic plan is now pointing to much increased industrial development, and, among many important features, space permits of mention only of the expansion of air transport and the growing use of radio telegraphy.

Venezuela is about twice the size of Germany, and the population is 3,500,000. Apart from large agricultural resources, Venezuela is now the third largest oil-producing country in the world. As was to be expected, the value of both exports and imports declined in 1940, compared with 1939, whilst, as in the case of Colombia, the favourable balance of trade is more apparent than real in view of the fact that exports consist largely of petroleum, the proceeds of which do not return to the country in full. It is for this reason that coffee plays a very large part in the economic position, despite the fact that exports of coffee are, in fact, very much lower than those of petroleum and its derivatives. Again, like Colombia, Venezuela is mainly dependent upon foreign supplies of imported manufactured goods, especially in the heavy industries. The urgent need of both countries is the development of adequate transport facilities, other communications and power, adumbrating an expanding demand for modern electrical equipment.

The remarks regarding methods of obtaining business connections in various South American countries dealt with in recent issues of the ELECTRICAL REVIEW, apply equally to Central America, as does the information regarding sources of advice. Again, prices must be keenly competitive, catalogues, etc., drawn up in Spanish and the metric system employed.

The best route for a representative to follow in visiting Central America is *via* New York, whence all the respective countries can be reached easily by air line, or, alternatively, by the steamships of the Grace Line or the United Fruit Company. In Colombia the customary and most convenient connection from the United States with Bogotá, the capital, and intermediate points is by air. Before leaving Great Britain the commercial visitor to the various countries should visit their respective consulates in this country in order to comply with passport regulations and to obtain conditions as to licences, samples, etc.

With regard to the financing of exports to the countries concerned, a large proportion of trade is conducted by means of documentary bills sent through a bank for collection. All the exchanges of the various countries are based upon the United States dollar, and the approximate sterling rates may be obtained by applying the dollar-sterling exchange rate. The following exchange rates were ruling in June, 1941:—Ecuador (official rate) 15.00 sucres per dollar; Guatemala (free rate) 1.00 quetzales per dollar; Nicaragua (official rate) 5.00 córdobas per dollar; Salvador (free rate) 2.50 colones per dollar; and Venezuela (official rate) 3.19 bolívares per dollar. The foregoing rates do not include taxes and commissions charged in certain countries.

Payment for British Goods

The Central American countries (including Ecuador, Guatemala, Nicaragua, El Salvador and Venezuela, but at present excluding Colombia) form a group with which British trade is now conducted under the Regulation of Payments (Central America) Order of May 16th, 1941. Payments between these countries and the sterling area are made through Central American accounts, but, unlike the Special Account system applicable to Argentina, Brazil, Chile, etc., payment for British goods can be made not only in sterling, but also in United States dollars. The dollars thus obtained must, of course, be sold to H.M. Treasury in accordance with the Defence Finance Regulations. Exchange and import control is in force in some of the countries, namely, Ecuador, Nicaragua and Venezuela. The various exchange regulations are subject to frequent change, but up-to-date information can generally be obtained from the Department of Overseas Trade or any British or American bank established there.

As already indicated, Colombia is the most promising market for electrical goods and

other imports, so that the following explanation of the import and exchange situation may be of value. Import permits are required for all goods, and are granted against a deposit of 10 per cent. of the value of the goods. Imported merchandise is divided into four groups, namely, (1) essential articles and imports by official bodies; (2) less essential goods; (3) and (4) articles of a luxury character or otherwise considered unessential. With a few exceptions, notably refrigerators and certain parts for wireless sets, electrical material is classified in Group 1.

Upon arrival of the shipping documents, an application for a remittance permit has to be made and the release of this permit depends upon the exchange situation. At present exchange for imports in the first group can be purchased without undue delay, at the open market rate of 7.10 pesos per £ plus taxes, whilst cover for goods in the other import groups is obtainable from an exchange fund, known as the "Stabilisation Fund," at the following rates plus taxes:—Group 2, 7.25 pesos per £; Group 3, 7.55 pesos; Group 4, 7.88 pesos. Advance remittances in payment for merchandise in all four groups are allowed by lodging the import permit and a bank undertaking (or a cash deposit) guaranteeing the production of documents proving the nationality of the goods.

The Colombian Exchange Control authorities recently intimated their desire to facilitate imports of British goods as far as possible, but an export licence must be obtained from the British Board of Trade for all goods shipped to Colombia and, at present, such licences are being restricted generally, although issued more readily for goods in the first group than for goods in the other three groups. Colombia is the only country in South and Central America with which the British Government has not made a payment arrangement for remittances to and from the sterling area; the exchange rate between Bogotá and London, however, has been stabilised for some time. Finally, the President of the Republic, in a recent address to Congress, called attention to the satisfactory condition of Colombia in spite of the European war and claimed that the country would prove capable of meeting any situation which might arise.

Among the smaller Republics, special mention should be made of Guatemala, which has enjoyed excellent government for several years, and where remarkable progress is being made in public works, particularly in building roads and bridges and in improving public utility services. Water-power resources in Guatemala have been estimated at 1,300,000 HP, but only about 16,500 HP has so far been developed.

A "Creeping" Reactive Meter

By J. Peacock

THE following communication was received by a supply company recently:—"Will you please send a representative round to our works to examine the reactive meter? We are on a power factor penalty and the instrument is creeping forward to our obvious disadvantage". The complaint was passed to the meter department and inspection followed. Upon the inspector's arrival he was shown the meter in question which was, in conjunction with a main kWh meter and a check kWh meter, measuring the supply to a battery of welders.

The "creep" rate of the reactive meter was timed and the registration would have assumed substantial proportions at the quarter's end. There was a definite, steady, progressive motion from all positions of the disc. This took place after a personal visit to all the welding points had been made and the inspector's assistant had reported uninterrupted registration during his senior's tour of the works. It being observed that the rotation was in no way characteristic of an intermittent creep motion, inspection was about to be made of the current transformers and meter series coils, with a view to discovering shorted turns. The works electrician then remarked that possibly they had been damaged when, recently, an apprentice had caused a heavy short by dropping a length of wire across the terminals of the main breaker. The inspector at once inquired if this breaker was closed.

It was found to be closed and that it was fitted with a no-volt release. The solution of the "creeping" problem was then obvious. The current taken by the breaker no-volt release was passing through the meters, lagging the voltage by a large angle due to the inductance of the solenoid coils. This current when resolved into its constituent components gave a small power component in the main and check kWh meters and a relatively large one in the reactive meter. The in-phase was well beneath the starting value for the cosine instrument while the reactive current was responsible for the mysterious "creeping" of the sine meter.

This was explained to the works electrician together with the necessary advice for correction by a small, permanently connected condenser. The condenser would, of course, not militate against the supply company owing to the ratchet in the reactive meter preventing backward rotation when the breaker was opened at night.

Hammersmith Carries On

Undertaking's Quick Recovery After Losing Offices

All the London supply undertakings have had their trials but have quickly surmounted them. Hammersmith provides an example

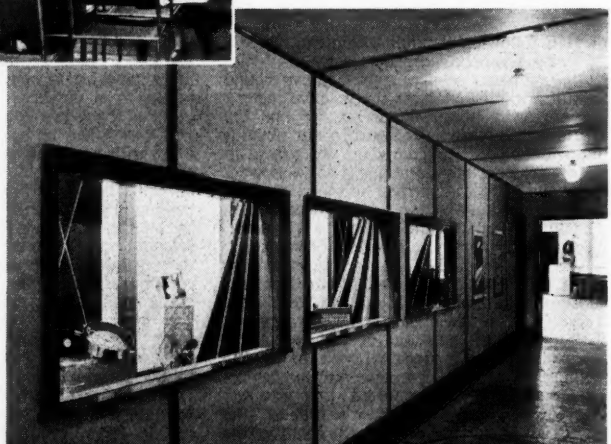
LIKE other London boroughs, Hammersmith has not escaped the attention of enemy aircraft, and its Electricity Department can claim its share of annoyance, to put it mildly, from bomb damage. The methods and speed with which the various difficulties have been overcome are typical of the spirit which is manifest throughout the electricity supply industry.

The damage to cables and substations has given the mains department a considerable amount of extra work, in addition to the many new works which have been in hand, but it has handled all repairs expeditiously and consumers have rarely been without electricity for more than a few hours. Last winter the Council's generating station was hard at work supplementing the grid supply, and it has been quite like the old days when Hammersmith generated all electricity used in the borough.

The department has had the misfortune to have high-explosive bombs on its offices and showrooms in Uxbridge Road, and also on its apparatus repair shop and stores. In the first place, the whole of the two top floors, in the front of the building comprising the offices, were completely demolished by a direct hit, while the showrooms which occupied the front portion of the ground floor were rendered unusable. The demonstration theatre at the rear, however, suffered little damage. When the first of the bombs fell several members of the staff were on duty, and it is truly miraculous that none of them suffered serious hurt, the worst being a broken arm and a small spinal injury. Actually one of them was on the roof at the time and, although being blown off and falling sixteen feet, sustained no worse hurt than a slightly cut ear and shock.

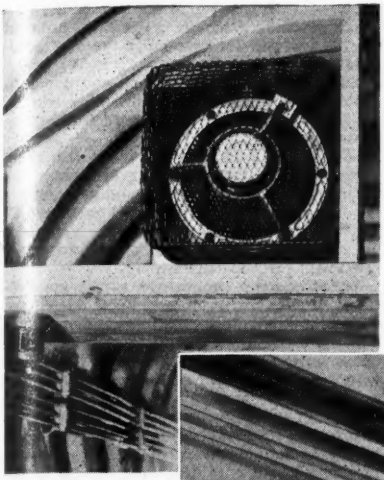
Nothing daunted by this experience and by the loss of its showrooms, offices, and many of its records, the staff immediately

Special wartime demonstrations are given regularly at the Hammersmith Electricity Department's demonstration theatre, which is now serving as an official Food Inquiry Bureau

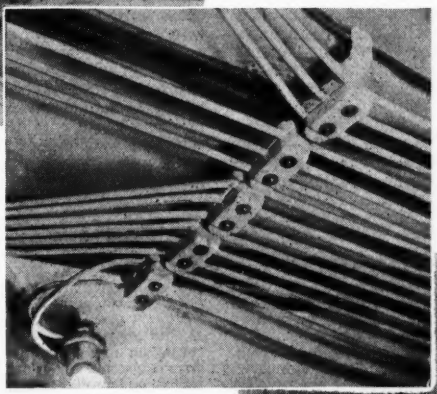


Illuminated display windows in the arcade leading through the bombed showrooms to the demonstration theatre

set themselves the task of getting things back to normal as soon as possible. There was, in fact, surprisingly little dislocation of the undertaking's work and actually accounts were paid the very next day in the undamaged portion of the building. The securing of new premises a few doors away from the damaged building took only two or three days, despite difficulties in getting into touch with the owner, and a fortnight later they had been made available for use.

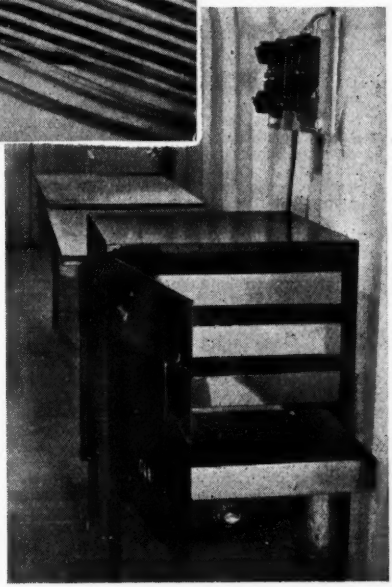


Above: One of the fan heaters installed at a shelter entrance



Centre: A three-wire system has been adopted for shelter lighting

This achievement is all the more remarkable when it is appreciated that the premises contained a considerable stock of goods and fixtures which had to be removed before the Electricity Department could make the necessary alterations and take possession. Now in some ways the arrangements there are more convenient and efficient than they were in the old premises, since the consumers' records section adjoins the showroom.



Right: A Government hot-cupboard for the use of shelterers

In order that the valuable space in the undamaged demonstration building should not be wasted, the front portion of the bombed building was boarded over and a covered arcade constructed through it, small illuminated windows in each side providing an attractive setting both for the Department's own display purposes, and also for publicising the "National Food Campaign," in which the undertaking has been co-operating wholeheartedly.

The showroom, which seats 130, was, in fact, one of the first to be opened as a Food Inquiry Bureau, and has recently been placed at the disposal of the Ministry of Food for special demonstration purposes. Incidentally, a notice board at the entrance to the demonstration room is attracting a good deal of attention. On it are placed any items of food news, including the B.B.C.'s "Kitchen Front" talks. More recently still the showroom has been called into service for a Ministry of Information exhibition on poison gas.

About three weeks after the damage occurred to the offices two more high-explosive bombs destroyed the apparatus repair shop and stores at the rear. The staff on duty again escaped serious injury. The stock of apparatus on the premises was comparatively small at the time, as the Council has adopted

the principle of dispersal by leaving apparatus in unoccupied premises. This undoubtedly reduced the damage caused by the bombs, and fully justified the Council's policy.

As well as coping with all these difficulties the Department has found time to improve still further the electrical facilities in the public shelters. In this it has been given a good start by the Council's forethought in having electric lighting installed in most of the shelters before the war started. The system utilised in them is ingenious. Standardised units comprising transformers, chargers and batteries (70 Ah at the six-hour rate) provide 24-V AC lighting normally, with emergency 12-V DC lighting from the batteries in case of failure of the mains supply. Dimming for sleeping is possible by means of resistances. Wiring is carried out with c.t.s. cables on porcelain cleats fixed to the ceiling, the 24-V lamps being connected to outers of the 3-wire system and the 12-V lamps being balanced between outers and neutral. When the AC supply is in use all lamps are alight, but when the battery is used both outers of the 3-wire system are made the same polarity and the 12-V lamps only are in operation. The system adopted also minimises voltage drop which is nowhere more than two or three volts.

Apart from the lighting, all public shelters have now been heated electrically. For the trench type, 3-kW fan-heaters installed one on each side of every entrance, in conjunction with extract fans on the escape hatches, ensure a distribution of warm air to every corner of the shelters, a circulation of about 350 cu. ft. of air a minute being achieved. The fans, both on the heaters and for extracting the air, incorporate shaded pole motors (35 W) which require very little attention and will not burn out if they stall. All the public surface shelters are being equipped with convector heaters before the winter.

Several of the larger shelters are also being provided with electric cooking facilities. For this purpose standard cookers and wash-boilers are being employed, as well as hot-cupboards (800 W loading) supplied by the Government. To eliminate all risk of shock these are being fitted with earth-leakage trips.

The Council's progressive policy in electricity supply has been continued during the war as far as circumstances and supplies permit, and the Electricity Committee under the able chairmanship of Councillor R. H. Kent, J.P., who is also the Mayor of Hammersmith, takes a keen and personal interest in ensuring that electrical facilities are available at a reasonable cost to everyone in the borough. The undertaking is looking forward to the post-war period, when a considerable extension of the supply is anticipated, and the possible load distribution in the borough is being carefully investigated in order that sufficient cable capacity and plant may always be available.

Electricity and Optics

A NEW textbook on this subject* for students of physics and electrical engineering presupposes some familiarity with the calculus and no previous knowledge of engineering. From this starting point it leads the student into somewhat deep waters, but it should not overtax his powers of understanding.

The first chapters deal with fundamental concepts and the properties of electrostatic and magnetic fields. Electric currents are treated as moving charges and the M.K.S. system is largely used, electrostatic charge being adopted as the fourth fundamental unit. Thus the student is spared the bewilderment he is bound to experience when introduced only to the two distinct, and, as it must appear to him, incompatible systems which still survive in our teaching of electricity and magnetism.

Many teachers still go to much trouble in order to conceal from themselves and their students that electrical and magnetic quantities can only be expressed in terms of four fundamental units. The basic concepts of stationary and moving charges lead naturally to the Maxwell displacement current, waves in transmission lines and in free space and to the Poynting vector and the Maxwell equations for electro-magnetic waves.

Properties of dielectrics and magnetic substances are treated in terms of electron theory and this treatment makes it clear that the observed effects can be explained if substances are regarded as consisting only of moving electric charges. Thus does it become clear that phenomena in tangible matter and in empty space are essentially of the same nature. Hence it becomes rational to proceed from a study of electro-magnetic waves in space to a study of such waves in dielectrics and thence further to geometrical optics, to the dispersion and scattering of light and radiation theory.

It will be clear from the above summary that this book goes far in the unification of physical phenomena. It shows that the forces between electric charges and currents, magnetism, "wireless" and optical effects may all be interpreted in the same fundamental terms. This is why the book under review differs considerably from the textbooks usually recommended to second-year students. Laws, principles, phenomena which are in most of the teaching said to be "proved" only by some experiment are here proved by deductive reasoning.

This method provides the student with a different and, I think, better background to his knowledge. To prove something by experiment may be necessary for those of limited reasoning power. For students with an inadequate mathematical equipment we cannot do otherwise. But it is the lazy way, the way that dodges a proper understanding. It is like proving the multiplication table by counting beads on a calculating frame.—R. O. K.

*"Introduction to Electricity and Optics." By N. H. Frank, D.Sc. Pp. 398; figs. 240. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 24s. 6d.

Insulating Oil Tests

Suggestions for the Revision of B.S.S.148

By Philip R. Coursey, B.Sc., M.I.E.E.
and
K. A. Gough, B.Sc., A.M.I.E.E.

PRESENT-DAY uses of insulating oils in the electrical industry are many and varied, but for many years past their manufacture and supply has been largely governed broadly by the requirements of B.S.S.148. The last edition of that Specification—now about eight years old—although showing considerable expansion beyond that of the early editions, still retained much the same form as the original Specification. In it all insulating oils were treated as belonging to one general type, and were divided into two classes between which the principal difference was the sludge value of the oil when tested under specified conditions.

The Specification in this form ignores the wide range of oils which are available to-day, and have been developed with rigid attention to the special properties required by an oil for a particular use. Its application lays emphasis on the development of an oil which will readily pass B.S.S.148 irrespective of its performance under working conditions.

The authors set out a number of tests which should enable the most suitable oils for specific purposes to be selected

Extension or Division

As the above-mentioned British Standard Specification is under revision, it would appear that the time is ripe either to widen its scope very considerably so as to include all such special oils, or to divide it up so that they are covered by two or more specifications. In this way the British Standard can revert to its proper sphere, namely, that of setting out all the essential requirements for the purchase of the oils and not merely to cover one application of them.* To achieve this end the basic divergence of applications must be recognised, and it is suggested that this provides a more suitable and fundamental basis of classification than do the sludge value or the solidifying temperature.

The applications to be differentiated are:—
A. Insulating and cooling media: (i) primarily for insulation; (ii) primarily for arc-quenching.
B. Dielectric media: (i) primarily for unidirectional and low-frequency uses; (ii) primarily for high-frequency uses.

Of these applications, the first, A (i), obviously covers transformer oil where the fluid insulating medium acts fundamentally as a cooling means to dissipate the heat evolved by transformers, reactors and the like. The second, A (ii), provides the analogous need of switch oils wherein resistance to the action of the electric arc, and ability to cool and quench the arc are properties of paramount importance.

The dielectric applications, B (i) and B (ii), cover uses mainly in cables and electrical condensers wherein the cooling action of the oil is of secondary importance to its dielectric properties and stability under very high stresses.

The distinction between B (i) and B (ii) is small. It does, however, serve to differentiate insulating oils suitable for use under (a) low-frequency or unidirectional stresses, wherein high permittivity and high dielectric strength are of primary importance and low dielectric losses come second†, and (b) high-frequency stresses, which are often very severe, wherein *low* dielectric losses, and high stability when subjected to electrical stress, are of the first importance. The property of high stability of insulating oils under electrical stress is of importance in all dielectric applications, but to a much higher degree in B (ii) than B (i).

Transformer Oil Test

The Anderson A.S.E.A. test‡ represents a useful attempt at devising a test for controlling this property, but it is directed mainly at the use of the oils for cooling transformers. It is, in fact, an accelerated sludging test—sludging of the oil is brought about by oxidation of the oil accelerated by catalytic action of metals (primarily copper) and by the electric stress. Its main limitations from a dielectric point of view are therefore:—1. The electric stress applied to the oil is low—approximately 1 V/μ (*i.e.*, 10 kV per cm.); 2. The test is influenced by the catalytic action of copper and iron.

* See discussion on F. Meyer's paper on "Fluid Filling Media" (*Jnl.I.E.E.* 86, pp. 313-326, April, 1940), also résumé in ELECTRICAL REVIEW, December 1st, 1939 (p. 703).

† Where the oil serves the function of insulation as distinct from a dielectric such as in cables—the lowest practicable permittivity is desirable, but otherwise such use falls in this category. If it should be the intention of B.S.I. to include cable uses as such, a special subdivision of this section would be needed.

‡ *A.S.E.A. Jnl.*, 6, pp. 127-155, 1929.

Deterioration of insulating oils in service is customarily evidenced in three forms: viz. Sludging, polymerisation with deposition of wax or "cheese" and gassing. The first occurs in transformer cooling, where the oil is relatively hot—say 50 deg. C or over—in the presence of oxygen. Electric stress is low in value, say, of an order of magnitude of 10 kV per cm. RMS, and while it may accelerate the action, its effect is relatively small. The sludge shows usually as a free or loose deposit in the oil which settles at the bottom of the tank and adheres to articles immersed in the oil, particularly if they are warmer than the body of the oil.

The second occurs under conditions where the oil is mainly separated from contact with free oxygen and is subjected to a somewhat greater electric stress (say, 20 to 40 kV per cm. RMS) at, again, usually a fairly high operating temperature—although a slightly lower one than in the first case above. The decomposition product shows as a wax-like insoluble substance, which is deposited on the surfaces of the solid insulating materials in contact with the oil and in the interstices of the fibrous impregnated insulating material—such as paper. It is a product particularly associated with the conditions existing in oil-impregnated paper cables.

The third type of decomposition is generally associated with the application of high electric stress (100 to 150 kV per cm. RMS) to the oil (or rather to the oil-impregnated fibrous insulation) and is practically independent of the presence of free oxygen and of the catalytic action of metals. The decomposition products are primarily hydrogen (gas) and water, although sometimes polymerisation of the oil takes place, resulting in the deposition of a small quantity of solid substance, simultaneously with the evolution of gas. Deposition of a solid is not, however, a necessary accompaniment of the decomposition. It is a reaction particularly associated with the highest electric stresses existing in oil-impregnated paper-dielectric condensers.

Effects of Stresses

These three classes of decomposition or subdivisions of the conditions causing or related to the same, all refer to the application of low-frequency alternating stresses to the oil or to the oil-impregnated insulation. Although still higher peak stresses (up to 400 to 500 kV per cm.) than those mentioned in connection with the third class are often employed in electrical condensers intended to be subjected to unidirectional stress only, there is little evidence that these high steady stresses are even as harmful as the much lower alternating stresses of the third class, above. It must not, however, be assumed from this that these DC stresses are without effect, but their effects have not been so fully studied.

These three main types of decomposition, although somewhat related, are not sufficiently so to be controllable by the same tests in each case. The first one is dealt with more or less adequately by the various accelerated sludging tests, such as that specified in B.S.S.148-1933, but even this has been proved to be not entirely adequate. For instance, this test tends to favour a very highly refined oil—the Grade "A" transformer oil—whereas practical experience shows that in the majority of the applications in which these oils are employed (use A (i) above), the less refined or "B" grade oils give more reliable service.*

The second form of deterioration is that experienced largely in paper-cable manufacture. This aspect has been subject to special study† and was outside the scope of the last edition of B.S.S.148, although for the sake of completeness and for the benefit of all oil users who may have need of such special tests, it would seem preferable to include it.

The third form necessitates some special tests to provide adequate supervision of the material. These broadly require the subjection of the oil to high electric stress, coupled with a further test to determine the ability of the oil to re-absorb the gases that are evolved.

High Temperature "Barrier" Test

Oil in bulk cannot, however, be subjected to sufficiently high stresses without immediate breakdown unless some "barriers" are present to limit the passage of ions across the liquid. One of the most satisfactory tests so far devised‡ uses the oil as an impregnant for paper so that the fibres provide this "barrier" action. To accelerate the results, the tests are made at an elevated temperature—75 deg. C. To what extent the use of this acceleration gives results that correlate with long-time service uses has not yet been fully explored, but a test of this form would seem to meet the chief requirements, particularly when combined with tests of the change of permittivity and power factor of the oil during the deterioration test and an investigation of the gas evolution and re-absorption properties of the oil.§

It is, therefore, recommended that in addition to requiring the basic physical tests stipulated in the present Specification, the fundamental classification, based on application or use of the oil, as set out above, should be added, together with further tests of the oil stability at lower temperatures and under electric stress—such as in the Anderson A.S.E.A. test, or some suitable modification thereof; tests of its stability at

* See, for example, *A.S.E.A. Jnl.*, 12, pp. 83-91 : 99-107 and 118-124, 1935, and *Industrial & Engineering Chem.*, 31, pp. 329-330, March, 1939.

† See, *e.g.*, Robinson "Dielectric Phenomena in High Voltage Cables." (Chapman & Hall) 1936.

‡ *Industrial & Engineering Chem.*, 31, p. 329, March, 1939.

§ See, *e.g.*, *Industrial & Engineering Chem.* 30, pp. 280-286 and 287-293, March, 1938.

high stresses in the presence of paper or similar fibrous material having the requisite barrier action, coupled in both cases with tests of the dielectric properties, permittivity and power factor of the oil itself, and preferably also of its insulation resistance; and finally tests of its gas evolution and re-absorption properties.

Whether or not definite limiting figures could be given for all of these tests for all the three basic uses of oils, will depend to a great extent upon the exact form of these tests that the B.S.I. may feel able to include in the new specification, but doubtless tentative or provisional figures could be inserted—an action for which a precedent exists in the 1923 edition of the specification.

In addition to the use of these tests to judge the relative merits of and to supervise manufacture of or deliveries of the oils, some of them have very useful application as supervisory tests to apply to samples of oil drawn from time to time from the article during its normal service. Apart from the chemical tests of acidity (Clause 6 of B.S.S.148—1933), the electrical test of insulation resistance is a very convenient one, and has the merit of simplicity of application under almost all conditions.

Any of the well-known oil test cells* may be employed for this test. Its exact form is immaterial provided that it has an adequate ratio of area of test electrodes to electrode spacing to enable a galvanometer of reasonable sensitivity to be employed. A value of this ratio of not less than 1500 : 1, where dimensions are in inches, is adequate for a DC testing voltage of from 300 to 500. The specific insulation of good dielectric oil determined in this way should always be much above 2×10^{14} ohm-cm.

In considering these tests for addition to the Specification, we are of the opinion that it should be borne in mind that no one test or, in fact, general series of tests, can give all the requisite information to suit the needs of every oil user. The best service that the Specification can hope to perform, is to provide a *basis* for the purchase of the material, by specifying the nature of useful tests and the manner in which they shall be performed. The individual user must select which tests best cover the properties most relevant to his particular needs, and must also choose the actual numerical limits that he will call for in connection with each such test.

* For descriptions of some cells the following may be consulted:—*Jnl. I.E.E.*, 86, pp. 326-328, April, 1940. *A.S.E.A. Jnl.*, 12, p. 124, Sept., 1935. *Review of Scientific Instruments*, 5, p. 194, May, 1934. *Industrial & Engineering Chem.*, 30, p. 288, March, 1938.

Electrical Appliances in Ontario

Hydro-electric Commission's Survey

ON the basis of reports submitted from municipalities and rural power districts, the Hydro-electric Power Commission of Ontario has published estimates of the number of electrical appliances in use at the end of last year. Among urban domestic consumers, who at the end of 1940 numbered 560,500, there has been a fairly regular growth in the use of electrical appliances since 1924 and, except for ranges, this has been only slightly affected by boom and depression years. With rural hamlet and farm consumers, who numbered 50,900 and 58,700 respectively, the increase in the use of appliances has barely kept pace with that of consumers connected, and indicates a considerable field for sales effort.

The most widely used type of mains-connected electrical apparatus was not, as might be expected, the radio set, but the electric iron, of which 516,804 were in service in urban areas, apart from 17,552 ironing machines, giving a total saturation of 95.3 per cent. In rural hamlets the proportion was 79.4 per cent. and on farms 77.7 per cent. Radio sets using electricity from the mains numbered 456,323, in urban areas, or 81.4 per cent. of the consumers (rural hamlets 74.0 per cent.; farms 75.4 per cent.). Toasters came next with a total of 349,132, or 62.3 per cent. (rural hamlets 54.1 per cent.; farms 52.9 per cent.).

Of the heavier types of equipment electric washers were most numerous among urban consumers, with 276,516 and 49.3 per cent. saturation. The proportion in rural hamlets was only slightly less (47.6 per cent.) while on farms (59.3 per cent.) it was substantially more than in towns. On the other hand, comparatively few ranges were connected in rural areas. In towns the number was 173,207 (apart from 101,356 hot-plates and 59,211 grills), or 30.9 per cent. saturation. In rural hamlets the proportion was only 13.2 per cent. and on farms 17.9 per cent. Similarly, water-heaters, which in towns numbered 126,939, or 22.6 per cent., were only in use in rural hamlets to the extent of 6.2 per cent. and on farms 6.7 per cent. Refrigerators in town homes numbered 119,757, or 21.3 per cent. of the total consumers, compared with 17 per cent. in hamlets and 15.7 per cent. on farms. Urban domestic consumers also used 7,057 air-conditioners.

For the work of the farm there were 10,763 motors and 8,861 pumps in use, besides 4,000 cream separators, 3,445 grain grinders, 2,047 milking machines, 1,294 milk coolers, 1,024 brooders, and miscellaneous other appliances.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1939

19883. "Apparatus for generating electricity, and electric power systems for vehicles and trains." L. L. de Kramolin. July 9th, 1938. (538303.)

28854. "Fluid-tight joint constructions." J. Beresford & Son, Ltd., and R. L. Gold. October 27th, 1939. (538357.)

28855. "Dynamo-electric machines." J. Beresford & Son, Ltd., and R. L. Gold. October 27th, 1939. (538358.)

28856. "Submersible electric motors." J. Beresford & Son, Ltd., and R. L. Gold. October 27th, 1939. (538359.)

28857. "Means for preventing leakage of fluid along the interior of electric cables." J. Beresford & Son, Ltd., and R. L. Gold. October 27th, 1939. (538360.)

30728. "Method of destroying micro-organisms by means of radiant energy." Westinghouse Electric International Co. December 22nd, 1938. (538361.)

32610. "Electric circuit arrangements comprising saturable electric chokes." General Electric Co., Ltd., and W. G. Thompson. December 20th, 1939. (538305.)

1940

201. "Quenching method and apparatus." Budd Induction Heating, Inc. January 11th, 1939. (538364.)

1507. "Selective electrical switching devices." Automatic Telephone & Electric Co., Ltd., C. R. Woodland, and E. J. Houghton. January 25th, 1940. (538366.)

1698. "Portable power-driven tools." Aro Equipment Corporation. January 23rd, 1939. (538315.)

1711. "Quick-acting electric switches." F. G. Gillard and Plessey Co., Ltd. January 27th, 1940. (538317.)

1756. "Electron-discharge valve circuits for the generation of electric currents of a desired wave-form." E. L. C. White, and E. W. Bull. January 29th, 1940. (Addition to 522637.) (538369.)

1841. "Magnetically operated electrical switches." Gas Accumulator Co. (United Kingdom), Ltd., and E. W. Dorton. January 30th, 1940. (538409.)

1845. "Electric-discharge lamps used with luminescent materials." General Electric Co., Ltd., J. N. Bowtell and H. G. Jenkins. January 30th, 1940. (538379.)

1853. "Thermionic valve apparatus." Standard Telephones & Cables, Ltd., and B. B. Jacobsen. January 30th, 1940. (538381.)

1854. "Distributors or commutators for multiplex signalling systems, and electron discharge devices therefor." Standard Telephones & Cables, Ltd. February 11th, 1939. (538382.)

1868. "Electric coupling devices." Electrolux, Ltd. February 20th, 1939. (538383.)

1899. "Impregnating compositions for electric insulation." Marconi's Wireless Telegraph Co., Ltd. January 31st, 1939. (538411.)

1936. "Television transmitting tubes, and methods of operation." Marconi's Wireless Telegraph Co., Ltd. January 31st, 1939. (538412.)

1987. "Pole changing arrangements for electric motors." British Thomson-Houston Co., Ltd. February 3rd, 1939. (538387.)

2614. "Method of optically copying sound tracks." Philips Lamps, Ltd. February 13th, 1939. (538319.)

2988. "Electrical socket members for thermionic valves and the like." Cinch Manufacturing Corporation. February 18th, 1939. (538388.)

3574. "Wireless receivers with band-spread tuning." Philips Lamps,, Ltd. February 28th 1939. (538389.)

5200. "Holders for lamps, valves and other devices." Carr Fastener Co., Ltd., and G. Wagstaff. March 20th, 1940. (538390.)

5461. "Photo-electric cells utilising electron multiplication." Mullard Radio Valve Co., Ltd. March 28th, 1939. (538321.)

5986. "System for cooling refrigerating chambers." M. Hirsch. April 3rd, 1940. (538425.)

8591. "Fluid-pressure operated electric switchgear." English Electric Co., Ltd., A. R. Blandford and F. G. Rowland. May 13th, 1940. (538349.)

10370. "Control systems for electric elevators or the like." Igranic Electric Co., Ltd. July 10th, 1939. (538323.)

10900. "Mercury vapour power plants." British Thomson-Houston Co., Ltd. June 28th, 1939. (538330.)

12603. "Electric vehicle drive systems." British Thomson-Houston Co., Ltd. August 4th 1939. (538334.)

17615. "Electrical starting systems for internal combustion engines." Carter Carburetor Corporation. April 15th, 1938. (Divided out of 531244.) (538352.)

Detection of Incendiary Bombs

A FURTHER specification in the series for automatic devices for the detection of incendiary bombs (BS/ARP 60) deals with the performance of special electric devices. The three main types are photo-conductive cells, photo-emissive cells, and photo-voltaic cells, together with their associated equipments.

The specification defines the performance of the detector in terms of operating distance, and a standard method of test to determine the operating distance is prescribed. It also lays down various conditions for the general design of the equipment with a view to ensuring reliability in operation, and some instructions are given regarding the method of installation and how to carry out tests after installation.

Copies of this specification may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 8d. post free.

Lamp Publicity

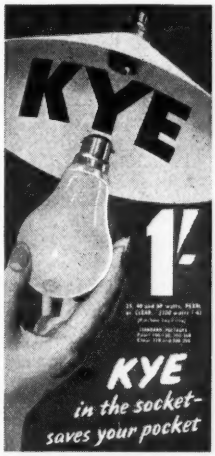
Manufacturers' Plans for the Coming Season

WITH the increasing concentration of factories on the production of supplies essential to the war effort, good lighting becomes an important factor, especially during the long periods of black-out which lie ahead, and the lamp manufacturers in preparing their campaigns for the coming season have borne this in mind. Despite paper restrictions they have succeeded in preparing an attractive assortment of window displays, showcards, window bills and literature, from which dealers will have a wide choice.

Crompton Parkinson, Ltd.

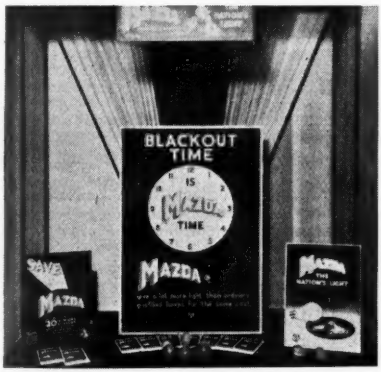
The series of shadow pictures illustrating various home occupations which Crompton Parkinson, Ltd., introduced last year has proved so successful that it is being continued this year with new designs and layouts emphasising the phrase "You Need a Good Light — You Need a Crompton." The theme "Kye in the Socket Saves Your Pocket" is also being further developed this season.

To give wider publicity to these slogans, National Press advertising is to be reinforced by widespread provincial publicity, and a series of announcements will appear in about forty of the larger provincial morning and evening papers. To assist retailers who wish to link up with this advertising the company is prepared to lend blocks and to give expert advice and assistance in the preparation of their local announcements. Fresh supplies of display material, literature and other sales aids are now being distributed by the company throughout the trade.



A Kye lamp advertisement which is appearing in the National and Provincial Press during the coming season

The Ediswan Underground Railway phosphorescent roof card



"Clock" window display for "Mazda" lamps

B.T.H. Co.

In common with other concerns the British Thomson-Houston Co., Ltd., has had to limit its usual publicity in connection with the "Mazda" lamp campaign. In spite of wartime restrictions, however, the company has succeeded in preparing a number of attractive sales aids. Principal among these is a series of six advertisements, each of which has a selected quotation from the works of Charles Dickens, bearing in some form or another on the subject of light, together with a line illustration of an appropriate Dickensian scene.

Two fresh window displays have been produced, each consisting of a linen sheet bearing a colour design imposed by the new silk screen process. The first, known as the "stamp display," embodies a picture of the lamp itself with the legend "The Stamp of a Good Lamp." The second, the "clock display," shows a clock dial incorporating effectively the suggestion that "Black-out Time is Mazda Time."

Lighting propaganda will be carried out on a large scale in the engineering and industrial Press, the main theme being "Light Conditioning for Production and Welfare." A large proportion of the customary "Mazda" lamp advertising will be continued and will be seen on escalators, in Tube lifts and in the carriages of the Underground Railways. Much of the 1940 advertising material is also still available.

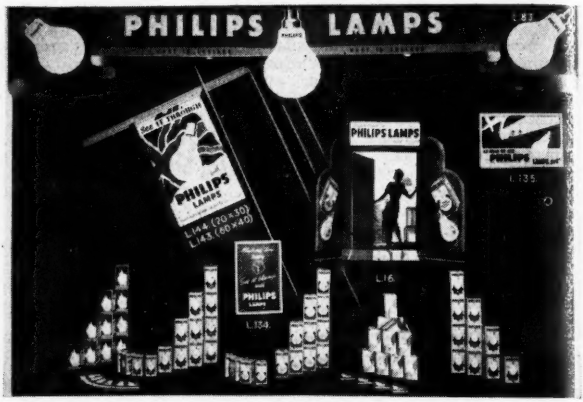
Edison Swan Electric Co., Ltd.

A new idea in Underground publicity is being introduced by the Edison Swan Electric Co., Ltd., in connection with its lamp campaign. This takes the form of phosphorescent roof cards which are affixed to the roof of Underground electric cars bearing the message "Let's See —Better Buy Royal Ediswan Lamps." Window displays are being continued, the difficulty of printing large centre-pieces having been overcome largely by the use of a linen background, frame mounted. The centre-piece already in use employs the design depicted in the 1940-41 display. The usual supporting window material will also be available in some new designs with the addition of transparent window adhesives linking up in design with the "Big Head" display.

Film publicity will be continued in "The Signs of the Times" magazines and in the two new films recently released and privately shown to the trade Press. So far as outdoor publicity is concerned, a new site measuring 45 ft. by 10 ft. has recently been acquired in Piccadilly Circus, while the Ediswan railway station signs are being continued.

Philips Lamps, Ltd.

In spite of still further restrictions on printed matter the 1941-42 lamp campaign of Philips Lamps, Ltd., will be on a much larger scale than was possible last year. In addition to posters in the Tubes, Press advertisements will appear in the leading provincial newspapers and in a London evening paper. Space has also been booked in two national periodicals and a much bigger drive is being made in the trade and technical Press.



One of the window displays which has been prepared by Philips Lamps, Ltd.

The colourful "Union Jack and Lamp" poster is being reprinted this year in 60 in. by 40 in. size, and it will also form a useful background for window displays. In the interests of paper economy no new displays will be produced, but ample supplies are available of the very effective displays and showcards that were used last year.

Interconnection in America

ACCORDING to the *Electrical World*, the Federal Power Commission, invoking for the first time its authority to order interconnections during an emergency, has directed prompt construction of seven strengthening links for the 17-State power pool created to serve defence requirements in the drought-stricken south-east. The new tie lines are estimated to make available an additional 200,000 kW of capacity to the pool within six months.

In addition to the seven specific orders, the Commission directed the Tennessee Valley Authority and the Cincinnati Gas & Electric Co. to study and report within two weeks on the practicability of tying together the utility's steam plant in Ohio with the Tennessee Valley Authority's facilities at Nashville and Watts Bar.

The seven lines ordered to be built must be started and completed without delay—without determining who shall bear the cost or the charges for power to be sent over the lines. Where agreement upon terms and conditions for use of these lines is not reached by the companies by the time they are ready for use, the Commission has authority to prescribe "such terms and conditions as it finds to be just and reasonable" after hearing the parties concerned.

COMMERCE and INDUSTRY

Electricians' War Bonus. Commissioners and Fire-watching.

Wages in the Contracting Industry

A FURTHER stage in the dispute between the National Federated Electrical Association and the Electrical Trades Union was reacted last week when the National Arbitration Tribunal issue its award. It will be recalled that the difference arose out of the agreement whereby hourly wages were stabilised for the period of the war and a weekly cost-of-living addition was established.

It was agreed that this addition should be revised periodically by a committee of the two parties, and it had reached 11s. 8d. a week when the N.F.E.A. proposed that the agreement should be revised. The E.T.U. would not concur in this and stated that it was not prepared to consider any arrangement which gave its members less than 15s. a week as war addition and referred the matter to the National Arbitration Tribunal.

After hearing both sides the Tribunal suggested that they should make another attempt to compose their differences themselves and offered the services of Sir John Forster, a member, to assist them. At a subsequent meeting of the N.J.I.C., with Sir John Forster present, the Union offered to abate its claim from 5d. to 4½d. per point rise according to the agreement. While the N.F.E.A. said that it was prepared to accept this as a basis of settlement, it insisted that the proportion of the cost-of-living increase due to taxation should be excluded from the calculation. This would have meant an increase in the war addition to 13s. 10d. a week and the Union declined to accept it.

Thereupon the matter went back to the Tribunal and that body has now decided that the agreement must be operated as it stands, stating at the same time that it deprecated the making of agreements for the period of the war without provision for review. As it was, the present agreement could only be varied or dissolved with the consent of both parties unless legislation was passed setting aside such agreements.

Registered Contractors

The undermentioned applications for registration were accepted by the Executive Committee of the National Register of Electrical Installation Contractors at its meeting on July 4th:—

Requirements Electrical & Engineering Ltd., Trafalgar House, Gt. Newport Street, London, W.C.2; Fred N. Warren, Bishop Auckland; C. Bull (trading as S. H. Lewin & Co.), 29, Walton Street, Chelsea, London, S.W.3; and Bedford Corporation Electricity Department.

At the same meeting two applications were declined.

Regulations and Registration

The Association of Supervising Electrical Engineers recently suggested to the Minister of Works and Buildings that electrical work in new and reconstructed buildings should be installed in accordance with an agreed wiring code and that only experienced and efficient electricians should be employed in the work.

In reply to this Lord Reith has indicated that he would be getting into touch with the President of the Institution of Electrical Engineers as the Institution was the most representative body for the purpose. The A.S.E.E. suggests that while the Institution's Post-war Planning Committee will deal with some aspects of the matter it is not clear how far it can deal with the suggested compulsory scheme foreshadowed by the A.S.E.E. and others, and now receiving consideration by the National Committee on Statutory Wiring Regulations and Registration. The Association says, however, that it has no doubt that discussions will take place on the general position now that the National Committee has resumed its activities.

Fire-Watching Duties

Certain members of the staff of Stoke Newington Electricity Department having failed to perform the fire-watching duties which they were required to carry out, a report was forwarded to the Electricity Commissioners for their observations. In reply the Commissioners suggested that the persons working at the premises should be notified that a compulsory scheme under the Fire Prevention (Business Premises) Order, 1941, was being adopted, which would mean that it would be compulsory for persons not exempted under the provisions of the Order to do fire prevention duties.

Insurance of Commodities

The Board of Trade has, with the approval of the Treasury, decided that in respect of the period beginning September 3rd, 1941, and ending December 2nd, 1941, the rate of premium payable under any policy of insurance issued under the Commodity Insurance Scheme shall continue to be at the rate of 7s. 6d. per cent. per month.

Torch Battery Contract Dispute

In the King's Bench Division on August 21st Mr. Justice Humphreys concluded the hearing of an action by Mr. W. Margolis against Newsom Bros., Ltd., trading as the General Shipping & Forwarding Co., for the return of £379 stated to have been paid for a consideration which had failed or for damages for breach of contract in connection with a consignment of 32,000 electric torch batteries from the Continent.

The plaintiff alleged that the batteries delivered were not as specified. The defendants counter-claimed in respect of 15,000 batteries and for other sums in respect of Customs duties. They pleaded that they had carried out the contract to the best of their endeavours, using all due care and diligence.

The plaintiff said that he had asked for "P.L.B." or "Tudor" batteries or those made by associated companies, and that he had instructed the defendants to inspect, through their Continental agent, the goods before they were dispatched. He alleged that batteries other than those which he stipulated had been supplied and they were useless.

The defendants denied that they had undertaken

the responsibility of inspection; but they had instructed their agents to see that the batteries were in good condition. The £379 claimed had been paid on account of Customs duties, etc.

His Lordship decided in defendants' favour and dismissed the claim with costs. On the counter-claim he awarded the defendants £146 and also awarded them a sum of £252 against the plaintiff and another party.

Exports to China

The Board of Trade has made an Order (S. R. & O. 1941, No. 1246) prohibiting as from August 25th, the export of any goods, except under licence, to China, the Japanese Pacific Islands and Macao. The Order does not, however, apply to goods exported through the port of Rangoon for transit overland to China (by the Burma Road) and for such consignments export licences will in future only be required in the case of those goods for which export licences are required for all destinations abroad or for all destinations outside the British Empire respectively.

Large Fluorescent Lighting Installation

What is claimed to be the largest fluorescent lighting installation in the world has recently been completed at the works of the Vega Airplane Co., Burbank, California. The main manufacturing building has a floor area of 707,000 sq. ft. and altogether 36,524 fluorescent tubes have been installed. They are all of the 40-W, 48-in. Kelvin white type, and with auxiliaries the total load amounts to 1,679 kW.

In the main assembly area of the works the fluorescent tubes are mounted at heights varying between 35 and 42 ft. and, according to the *Electrical World*, an intensity of 45 ft.-candles is maintained 3 ft. above the floor level. The fixtures are mounted in parallel rows 8½ ft. apart with 17½ in. spaces between the ends of the tubes. All the lighting circuits are, as far as possible, balanced on a three-phase, four-wire 120/208 V system, the power to the lighting circuits being supplied through eight distribution substations, each furnished with from four to eight transformers.

Protective Helmets for Civilians

The Ministry of Home Security, in conjunction with the Ministry of Supply, has arranged for supplies of civilian steel helmets to be available for workers in factories and commercial premises. These helmets can now be purchased by employers at the price of 5s. 6d. each, for the use of their employees. Employers are asked to co-operate by equipping all their workpeople with these helmets. They are permitted to claim the outlay as a trade expense in computing their profits for taxation purposes.

Applications from employers for helmets for their workers generally will be dealt with on behalf of the Ministry of Home Security by the appropriate Government Departments and local authorities. Applications should cover all classes of employees, including managerial and office staffs and workers employed wholly or partly outside the premises.

For factories in which the A.R.P. arrangements are supervised by the Admiralty, Ministry of Supply or Ministry of Aircraft Production, applications should be made to those Departments. So far as concerns electricity undertakings (other than local authority undertakings), applications should be made to the Electricity Commission. All local authority undertakings (public utilities and passenger transport) should apply to the Ministry of Home Security (through the clerk of the local authority concerned). For all other factories where more than 30 persons are employed applications should be made to District Inspectors of Factories on behalf of the Ministry of Labour and National Service, and for smaller factories and commercial offices, shops and other premises, to the local authority in whose area the premises are situated.

Copies of a leaflet giving full particulars of how the helmets may be acquired can be obtained by employers from the Ministry of Home Security Publications Department, Horseferry House, Thorney Street, London, S.W.1.

Exports to Iran Restricted

Following upon the entry of British and Russian forces into Iran this week, the Board of Trade has made the Export of Goods (Control) (No. 30) Order, which prohibits the export of goods to that country except under licence. The Order (S.R.& O. No. 1260) can be obtained from the Stationery Office.

Purchase Tax Decision

Among recent decisions arrived at by the Board of Trade with regard to the application of Purchase Tax is one under Class 7 (*b*) (Domestic cooking and heating appliances). This is to the effect that the following articles are regarded as still-room equipment and not chargeable with tax:—Water jacketed urns with an interior capacity of two gallons or more; insulated lined urns; oval and double-lined counter urns; counter water boilers; and combination counter sets consisting of urns and boilers.

De-reservation of Men

On October 1st, Stage C of the Schedule of Reserved Occupations is reached, and although men affected by the "de-reservation" will not be called upon to join the Services before that date they may be required to attend for medical examination during September. Employers who wish to secure the deferment of calling-up of men engaged in work of urgent national importance are notified that they should make application not later than September 6th.

Electric Furnace Built in South Africa

One of the first electric furnaces to be built in the Union has just been installed at an engineering works on the Reef, reports *Reuter's Trade Service* from Johannesburg. The furnace took four months to complete and is specially designed for carburising, a process for the conversion of mild into super-hard steel. Its power consumption is 60 kW, and the normal temperature 900 deg. C.

Directory of Merchants, Manufacturers and Shippers

Kelly's Directory of Merchants, Manufacturers & Shippers for 1941, which has just been published, has for long been regarded as an indispensable work of reference for commercial firms whether their interests lie at home or abroad. Owing to prevailing conditions the work this year consists of one volume instead of two as it has not been possible to publish the usual volume dealing with countries outside the British Empire.

The larger part of the book deals with the British Isles, and this section is in fact a directory containing a complete list of manufacturers and merchants in the British Isles classified under 6,000 separate trade headings. The section for Great Britain and Ireland is, as usual, divided into three parts: (1) England, Scotland and Wales, except London; (2) London; (3) Ireland. Each part contains an alphabetical list of firms, and to facilitate reference all names in each part are classified both alphabetically and by trades, and there are separate lists of exporters and importers.

The next section is devoted to the rest of the British Empire. Here the names of agents, exporters, importers, wholesale merchants and manufacturers are arranged alphabetically by trades and towns under the various geographical divisions. These two sections of the book thus cover, as before, the wholesale trade of the British Empire.

The publishers are Kelly's Directories, Ltd., 186, Strand, London, W.C.2, and the price is 50s.

Electric Fire Maintenance

With industry on a war footing, consumers find it difficult to replace their electric fires by new ones, and they will therefore welcome any suggestions for getting the best out of their fires and for reconditioning them. Ferranti, Ltd., have issued a useful booklet in which hints are given to owners for maintaining the efficiency of their fires and for carrying out replacements of various parts.

Nickel Data

The properties of nickel as well as those of most of the more important alloys containing this resistant metal are tabulated in a 40-page brochure which is obtainable free of charge from the Mond Nickel Co., Ltd., Grosvenor House, Park Lane, London, W.1. This should be of value to designing staffs and all who need technical information to assist them in specifying materials.

Wages in the Cable-making Industry

The Joint Industrial Council for the Electrical Cable-Making Industry announces that the cost-of-living index figure on August 1st will not involve any alteration in wages on the third pay-day in September.

Colliery Plugs

The range of plug-in-socket couplers for use underground in coal mines recently marketed by Hugh Wood & Co., Ltd., Low Fell, Gateshead-on-Tyne, 11, includes 15/30/100A sizes of both the "free" pattern and bolted designs for "permanent" connection to gate-end boxes and switchgear panels. They are mostly intended for joining drill cables, affording a ready means of disconnecting the tool without going back to the gate-end box.

There are several types of each size; one has a spigoted base which allows for part of the socket to be sunk inside the drill panel to reduce overhang as the socket insulation is actually inside the panel. Another is made for connecting five-core cables, while the type that is fitted with glands for accommodating screened cable not only grips the outer rubber but also the metal screen as well as the rubber sheath beneath it, so reducing the risk of the cable being pulled out. The 100-A coupler is suitable for coal cutters and conveyors, being provided with a screwed earthing connector on each side of the plug, together with a small grub screw to lock each earthing screw.

Another type may be fitted with a patented adaptor to convert the socket for remote pilot control, a twin-core cable entering through a gland on the side of the adaptor, so that one core is earthed inside and the pilot core goes through the socket (insulated through the gland) to a push-pull switch. All types have been certified flame-proof and approved by the Mines Department.

Quebec Mining Activity

Preliminary figures for 1940 indicate a total value of mineral production in the province of Quebec of $85,621,000, according to the monthly review *Agricultural and Industrial Progress in Canada*. This compares with a value for 1939 of $77,370,000, while in 1932 the amount was only $25,683,000. The main factor contributing to the steady growth has been the continued expansion of metal mining in western Quebec, which produces gold, silver, copper, zinc, selenium, tellurium and pyrite. Between 1932 and 1939 the quantity of gold and silver mined was more than doubled, and the copper output rose from 60,584,000 to 115,390,000 lb. The zinc output increased from 5,316,000 lb. in 1938 to 28,759,000 lb. in 1939, but there was a decrease in the quantity of selenium from 217,900 to 23,800 lb. and in tellurium from 41,600 to 2,900 lb.

Changes of Address

The supply branch of the Industries and Manufactures Department 2, Board of Trade, has moved to Marsham Court, Bournemouth (telephone: Bournemouth 6301 and 7210). Inquiries from persons registered under the Limitation of Supplies Orders should continue to be addressed to the Industries and Manufactures Department 2, Board of Trade, Carlton Hotel, Bournemouth (telephone: Bournemouth 7210), while inquiries from retailers should go to the Industries and Manufactures Department 2, Board of Trade, Pine Court, Bournemouth (telephone : Bournemouth 7210).

The London office address of Howells (Electric Motors), Ltd., will be 29, Winchmore Hill Road, Southgate, N.14 (telephone: Palmers Green 5428) as from August 22nd.

Mr. H. H. Leage, London agent for a number of electrical concerns, has given up his Newbury office and is now at 46, Lincoln's Inn Fields, London, W.C.2 (telephone: Holborn 7131).

TRADE MARK APPLICATIONS

AMONG recent applications for British trade marks are the following, objections to which may be entered within a month of August 20th:—

SUPERVIN. No. 615,057, Class 9. Electric cables and electric wire. No. 615,058, Class 17. Electric insulating materials, electric insulators, electric insulating tubing and sleeving and parts of electrical apparatus made of insulating material. W. T. Henley's Telegraph Works Co., Ltd., Milton Court, Westcott, Dorking, Surrey.

ELECTRICITY SUPPLY

Manchester Coal Reserve. Southend Abandons Trams.

Cheshire.—ELECTRICITY FOR WARDENS' POSTS.—The County Emergency Committee has approved expenditure of £472 for installing electricity at 29 wardens' posts.

Darlington. — MAINS. — The Corporation is applying for sanction to borrow £1,000 for unspecified mains and services.

Dartford.—POWER CHARGES.—The Corporation Electricity Committee recommends that the No. 2 power tariff should be increased to bring it into line with the No. 1 power tariff, and the following rates are recommended:—First 1,250 kWh per month, 1.825d. per kWh, and all additional consumption, 1.075d. per kWh, subject to coal adjustment of 0.012d. per kWh per 1s. variation above 20s. per ton.

Douglas (I.O.M.).—SUPPLY TO OAKHILL.—The Corporation Electricity Committee is to extend the mains to provide a supply to Oakhill at a cost of £925.

Dewsbury.—DISTRIBUTING GEAR.—Instead of an e.h.v. switchboard and two reactors costing £2,848, the Electricity Committee is to install a regulator costing £1,804. The scheme for providing a duplicate supply at a substation has been abandoned, but the equipment ordered will be used for other purposes, and the contractors will supply a standard portable three-unit switchboard for £750.

King's Lynn.—UNDERTAKING'S SATISFACTORY POSITION.—Referring to the accounts of the electricity undertaking for the past year at last week's meeting of the Town Council, Alderman W. B. Lock indicated that the position was very satisfactory. As a result, there would be no increase in charges during the ensuing six months, although he pointed out that when the tariff was fixed coal cost the undertaking 18s. a ton; now it cost over 30s. a ton, and another 5s. a ton had to be spent on additional handling to release trucks. He said it was his duty to ask the public to economise as far as possible in the use of electricity at the present time. In reply to a question, he said that provided the position got no worse they should have no trouble with regard to coal supplies.

Manchester.—COAL SITUATION.—The *Manchester Guardian* reports that at the close of last week's meeting of the Electricity Committee the chairman (Councillor C. F. Terry) suggested that all the representations that had been made to the Mines Department with regard to the coal situation seemed to have fallen on deaf ears. He pointed out that although the Electricity Department was not drawing upon stocks to meet current needs, its reserves were not being built up as they ought to be. The coal it now had in reserve represented only 50 per cent. of the reserve supplies in hand a year ago.

Middlesbrough.—ELECTRIC ORGAN.—The Town Council is to install a new electric organ at the Town Hall at a cost of £700.

LOAN.—The Town Council is applying to the Electricity Commissioners for sanction to borrow £1,252 to cover the cost of redistributing the load at a substation.

Stockton-on-Tees.—SHELTER INSTALLATIONS.—Electric lighting is to be installed in 175 communal shelters. It is proposed to make a special charge of 2d. per kWh for both lighting and heating. The ordinary charges are 3¼d. for lighting and 1¼d. for heating.

Whitehaven.—NEW MAIN.—The Water and Electricity Committee recommends the laying of a new four-core main at a cost of £509.

Overseas

Canada.—TORONTO SYSTEM PROGRESS.—The thirtieth annual report of the Toronto Electric Commissioners, covering the calendar year 1940, reveals a drop in the annual peak load from 383,526 to 379,542 HP, apparently due to the extension of "daylight saving" time throughout the winter. Total sales, however, rose from 1,116.9 million kWh in 1939 to 1,207.1 million kWh last year, and compared with the usual annual increase of about a thousand in the number of meters in use, last year there was an addition of 3,167, making the total 198,437. Gross income was $14.0 million and $7.5 million was paid to the Hydro-electric Power Commission of Ontario for electrical energy purchased. The net profit of $543,000 was transferred to reserve for stabilisation of rates.

BLACK-OUT TEST. — Tests of the black-out arrangements in Toronto were carried out recently. Public lighting and traction supplies were switched off for a quarter of an hour and there was a drop of 100,500 kW in load.

TRANSPORT

Darlington.—TROLLEY-BUSES.—The Ministry of Transport has extended for three years from July 14th last the Council's option to extend its trolley-bus service to other routes in the town. Subject to licences being granted the Transport Committee is to order eight new trolley-buses.

Glasgow.—TRANSPORT ESTIMATES.—The Corporation Transport Committee estimates that total revenue during the present financial year will amount to £4,030,000 and expenditure £4,004,000, leaving a surplus of £26,000. The transport manager, however, has again emphasised the difficulty of estimating transport revenue under present conditions.

Southend-on-Sea.—ABOLITION OF TRAMS.—Approval has been given by the Ministry of War Transport to the proposal of the Town Council to abolish tramways in the town, and to substitute trolley-buses and motor-buses. The trolley-buses from Chalkwell Schools, Westcliff, will connect with the existing terminus in Nelson Road, along London Road, Southchurch Road, and Southchurch Avenue to Marine Parade. A motor-bus service will run from Leigh Broadway to Hamstel Road. The cost of the trolley vehicle equipment is estimated at £3,000, and of the road work at £4,578, allowance being made for the credit from the sale of tram lines, etc. As soon as road service licences for the motor-buses have been obtained from the Regional Transport Commissioners, work on the substitution will begin.

Power Control in Japan

Rationalisation of Generation and Distribution

By a Correspondent

ARRANGEMENTS for increased generation of electricity, a system of regional transmission and distribution, and the constitution of special distributing companies, will be ready by June next year, and, in preparation for the operation of the new system, the Japanese Ministry of Communications is now studying the measures to be taken to adjust light and power charges.

At present these are far lower in congested areas than in the more sparsely-populated districts. It is also noted that whereas other commodities have soared in price, electricity is cheaper than it has ever been. Taking 100 as representing the average price of commodities in 1923, by 1939 electricity charges had been reduced to 73.3, while the average price of other commodities had risen to 272.

The Electric Power and Light Control Commission of the Osaka Municipality recently agreed with the Government plan to control all power plants. It also agreed that average lighting rates should be raised. Tokyo, Kyoto, Kobe, Sendai, Kanazawa, Shizuoka and Sakata at first opposed the Government plan. At a meeting held recently, however, the cities agreed that electric power production should be in the hands of a public utility organisation. Reports read at the meeting explained the effect State control would have on the financial and political standing of the cities. It was also agreed that State control would eventually benefit the community and finally all the cities mentioned decided to inform the Ministry of Communication that they accepted the Government plan. The change in view, of course, was the result of pressure.

Distribution Plans

It is understood that at first eight semi-official distribution companies will be formed. When these are working satisfactorily further plans will be discussed. It is realised that the change-over will not be easy, some power producing plants being already public utilities while others are privately owned. The Taisei Yokusan Kai (Imperial Rule Assistance Association), an official body, will play a large part in organising the passing of the power companies to Government control.

Mr. Yamada, Vice-Minister of Communications, recently clarified the position. It was true, he said, that along with the rationalisation of power generation and transmission the Government was making a thorough study of the policy governing electricity charges, but the general impression that this was a step towards eventual raising of charges was incorrect. What the Government was trying to do was to make a careful check of the cost of production with a view to suppressing its rise and thus precluding any undesirable effects on existing power charges. It constituted but one of the many reasons for the rationalisation of power enterprises and it could safely be said that the Government had no intention of raising existing electricity charges even after this rationalisation had been completed.

This statement came as a surprise because it was understood that charges would be raised for the reasons stated above. Obviously the Government is a little worried about the reception of its plan by the general public. Meanwhile the first steps in the change-over are being undertaken. Committees are being set up and the assets of the various companies are being examined.

Controlling Consumption

Consumption is also to be controlled and the authorities have issued the following decrees with regard to small and medium power consumers:—

(1) Any additional supply of electric power exceeding 15 kW but not more than 100 kW shall be subject to a permit to be issued by the Communications Bureau.

(2) Preferential allocation shall be granted to industrial plants in the order of their respective importance, with priority for ammunition plants, basic industrial plants and those engaged in the production of the major daily necessities.

(3) Over-expansion of industrial equipment without due consideration of the power supply involved results in waste, and hence industrial expansion which entails additional power supplies will be subject to control. The officials concerned are to maintain close liaison with the Communications Bureau as regards power supply before permits are granted.

Large Japanese Dam

SUIHO DAM, said to be second only in size to the United States Boulder Dam, has been completed after four years, states a *Reuter* message from Tokyo. The Dam, some 50 miles above Singi Sui at the mouth of the Orokkyo river which forms the Korea-Manchukuo border, cost 200,000,000 yen (about £13,000,000). Two generators are being put into commission this week, a third is to start some time this year, and others will follow within the next two years.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Brush Electrical Engineering Co., Ltd., held its annual meeting on August 19th, when Sir Ronald W. Matthews (chairman), who presided, said that the works throughout the year had been busy and there was a substantial increase in turnover. This year he did not propose to give an account of the company's various activities, but the steady progress which had been made during the last year or two was continuing. In spite of restrictions they had been able to maintain many of their export connections and during the year they had extended their research.

With the increasing need for trained personnel in industry, the company had inaugurated a Brush scholarship tenable for four years and was encouraging men from public schools and universities to become pupils at the works. More attention had been paid to the welfare of employees and the personnel in the labour and welfare department had been augmented.

W. T. Henley's Telegraph Works Co., Ltd. held its annual meeting on August 22nd, when Sir Montague Hughman (chairman), who presided, said that 1940 was one of the most difficult years in the company's history. It had been a year of anxiety—large numbers of their staff and workpeople had been called up and the constant changes in personnel had added to their burdens. Nevertheless, they had by extraordinary efforts employed a larger number of staff and workpeople than in 1939 and the hours worked in their factories showed a substantial increase on former years. He paid tribute to the staff and workpeople who had carried on at times under very trying conditions.

During part of the past year at their rubber cable works they reached a fresh record in the mileage of output and this in wartime under very difficult conditions was a remarkable achievement. All employed by Henley's continued to look after the welfare of those who had been called up, and the increased burden placed upon them by larger numbers having to be provided for had been met most willingly and generously. Some of their people had lost their lives in the service of the country, while others had suffered from wounds and sickness.

Referring to the company's work during the year, Sir Montague said that on the research and technical side the year had been outstanding because of the continuous search for alternative materials to replace those which had become scarce under war conditions.

During the year work carried out in their Contract Department was on a much larger scale as compared with 1939 and extended to all parts of the British Isles and also overseas. The business of their overseas branches had again proved satisfactory, the turnover and profits being the highest on record ; the turnover and profits represented over 28 per cent. of the total turnover of the company, a remarkable achievement in wartime. Their subsidiary companies continued to carry out a substantial amount of business. Their South African company had again shown record profits and turnover, while the turnover of the Tyre Company had been substantial and a profit had again been made. The Holborn Construction Co. had been fully employed throughout the year. While a considerable number of small contracts had been completed with satisfactory results, the company had been mainly engaged on several substantial contracts which were still in progress at the end of the year.

Mr. W. F. Bishop (general manager), in seconding the resolution for the adoption of the report and accounts, referred to some of the difficulties which had had to be surmounted in 1940, and expressed his appreciation of the efforts of the staff and workpeople in overcoming these difficulties and enabling Henley's to deliver the goods.

Victoria Falls & Transvaal Power Co., Ltd.—In the course of the statement which had been circulated prior to the meeting on August 22nd, the chairman (Mr. A. E. Hadley, C.B.E.) said that the manufacture and shipments of materials for the existing and new power stations and for the transmission system had naturally to take their place with other work of similar importance to the war effort, but they had so far continued, though at a slower rate and subject to interruptions.

Extraordinary general meetings were being called to convert the present fully paid £1 ordinary and preference shares to units of stock of the same face value.

The chairman's statement concluded with an appreciation of the outstanding success of the staff in maintaining supply, the extension and upkeep of the plant, and the general conduct of the business.

Aron Electricity Meter, Ltd., reports a trading profit for the year ended March 31st, after providing for tax, of £20,183, as compared with £3,176 for the preceding year After allocating £10,501 for directors' fees, management expenses, etc., there is a net profit of £9,682 as against a net loss of £3,950 a year ago, when £10,000 was transferred from income tax equalisation account. Dividends are resumed by the payment of 7½ per cent. for the year, and £8,122 is carried forward (against £3,985 brought in). The previous distribution was 15 per cent. for 1938-39.

James Howden & Co., Ltd., report a profit for the year to April 30th of £116,279, as compared with £105,871 for 1939-40. The following deductions have been made: Interest, £9,738; depreciation, £20,544; war damage insurance, £4,542; directors' fees, £1,400; taxation, £24,000; and general reserve, £20,000. The ordinary dividend for the year is maintained at 1s. 6d. per share and £18,046 is carried forward, against £17,693 brought in.

Solus, Teoranta.—The company, which manufactures electric lamps, etc., in Eire, reports a net profit for the year ended June 30th, after making provision for directors' fees and other applicable charges, of £16,642, as compared with £25,378 in the previous year. No transfer is made to general

reserve (against £4,000) and provision for income tax and corporation profits tax is £6,000 (£8,000). A final dividend of 5 per cent. on the "A" and "B" ordinary shares is recommended, making 10 per cent. for the year; last year the same dividend was paid, but with the addition of a 2½ per cent. bonus.

The Calcutta Electric Supply Corporation, Ltd., announces that the gross dividend of 5.339 per cent. per annum declared on the preference stock in respect of the half-year to June 30th represents, after deduction of the estimated British rate of income-tax, a net dividend for the half-year of £1 19s. 4½d. per cent.

The Mid-Southern Utility Co. announces interim dividends of 2$\frac{13}{16}$ per cent. on "A" stock, 1$\frac{13}{16}$ per cent. on "B" stock and 2½ per cent. on "C" stock, the same as last year.

The Jerusalem Electric and Public Service Corporation, Ltd., has declared a dividend of 5 per cent. for the past year as compared with 7 per cent. for 1939.

The London Electrical & General Trust, Ltd., has announced a final ordinary dividend of 3 per cent., less tax, making 5 per cent. for the year (against 5½ per cent.).

The North-Eastern Electric Supply Co., Ltd., has announced an interim ordinary dividend of 2½ per cent. (same).

The South London Electric Supply Corporation, Ltd., has declared an interim ordinary dividend of 3 per cent. (same).

Telephone Rentals, Ltd., has declared a final dividend of 6 per cent., making 10 per cent. for the year (unchanged).

The Clyde Valley Electrical Power Co., Ltd., is again paying an interim ordinary dividend of 3 per cent., less tax.

New Companies

United Electric Co. (Liverpool), Ltd.—Private company. Registered August 14th. Capital, £1,000. Objects: To carry on the business of electricians, electrical and mechanical engineers, manufacturers of, and dealers in, electric lamps, fittings, electroliers, appliances, lampshades, valves, dynamos, accumulators and all kinds of utensils and apparatus used in connection with electricity, &c. Directors: A. Watt, 8, Whittycroft Avenue, Barrowford, Lancs., and E. Scott, Norman Villa, Anlaby, Yorks. Registered office: 6, Hunter Street, Liverpool, 3.

Progress Cables (Kent), Ltd.—Private company. Registered August 15th. Capital, £500. Objects: To carry on the business of manufacturers, manufacturers' agents, suppliers of electrical accessories, cables, lamps, stoves, appliances, batteries, accumulators, wireless and television sets and parts, loudspeakers, microphones, &c. Directors: S. A. Harrowell, "Sydenvan," Dollis Lane, Mill Hill, N.W.7, and two others. Registered office: 20, The Broadway, Bexley Heath, Kent.

Companies' Returns

Statements of Capital

British Thomson-Houston Co., Ltd.—Capital, £4,000,000 in 2,000,000 7 per cent. cumulative preference and 2,000,000 ordinary shares of £1 each. Return dated April 4th, 1941. 1,500,000 preference and 2,000,000 ordinary shares taken up. £3,425,310 paid. £74,690 considered as paid. Mortgages and charges: £1,210,790.

Ericsson Telephones, Ltd.—Capital £700,000 in 199,970 7 per cent. preference shares of £1 and 499,970 ordinary shares of 5s. and £375,037 10s. in ordinary stock. Return dated April 17th, 1941. All preference shares and ordinary stock taken up. £269,980 paid. £305,027 10s. considered as paid. Mortgages and charges: £50,000.

Park Royal Engineering Co., Ltd.—Capital, £50,000 in £1 shares. Return dated March 26th, 1941. 37,605 shares taken up. £36,605 paid. £1,000 considered as paid. Mortgages and charges: Nil.

Mortgages and Charges

Truvox Engineering Co., Ltd.—Mortgage or charge dated July 31st, 1941, by an addition to the schedule of contracts in a charge dated March 6th, 1941, to secure all moneys due or to become due from the company to Westminster Bank, Ltd.

Micalectric, Ltd.—First debenture charged on the company's undertaking and property, present and future, including uncalled and unpaid capital, dated August 6th, 1941, to secure all moneys due or to become due from the company to Westminster Bank, Ltd.

Frank Watson (Croydon), Ltd.—Particulars filed of debentures not exceeding £1,500 authorised by resolutions of January 26th, 1940, and July 17th, 1941, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £1,000.

Underwood (Electric), Ltd.—Assignment on August 6th, 1941, of proceeds of certain contracts, to secure all moneys due or to become due from the company to Martins Bank, Ltd., not exceeding £8,000.

Referring to the note under this heading in our August 1st issue, the company asks us to state that the assignment relates only to specific contracts. There is no charge on the company's stock or moneys due from customers.

Universal Rentals, Ltd.—Debenture dated July 25th, 1941, to secure £3,000, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: Geo. D. Le Lievre, Barnes Lodge, King's Langley.

Thorpe & Thorpe, Ltd.—Equitable charge on proceeds of contracts, dated July 18th, 1941, to secure all moneys due or to become due from the company to Coutts & Co.

British Electricon (London), Ltd.—Satisfaction to the extent of £300 on July 14th, 1941, of debentures dated February 28th, 1939, and registered March 3rd, 1939.

Winding-up Petition

Newmectric, Ltd.—A petition for the winding-up of this company has been presented by a creditor and will be heard at the Royal Courts of Justice London, on October 20th. Notification of in-

(*Continued on page* 181)

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets are again likely to have millions of pounds capital turning in their direction for early employment. The Dominion of Canada has given notice of its intention to pay off about £35 millions of Canadian stocks, and although the first payment will not be made until October 6th next, buying in advance of the receipt of the cash is already noticeable. The British Government will shortly be in the market with a fresh form of borrowing in one shape or another, but this is a consideration which acts as no deterrent to the purchase of stocks at the present time.

The effect of the present position is felt far beyond the circumscribed area of gilt-edged securities; it has a definite influence in the markets for such front-rank ordinary shares as those of the electricity supply, and kindred undertakings. Developments on the Russian front may cause an occasional setback in Stock Exchange prices, but this does not affect the fundamental factors of an abundance of money on the one hand and a shortage of stock on the other.

Home Railway Hopes

The reassembling of Parliament for the new session is anticipated with pleasurable interest by holders of Home Railway stocks who expect that the Government will soon publish terms of the new agreement to be made between the Treasury and the railway companies. Negotiations have been going on since the early days of the year and according to the way in which rumour sported so Home Railway prices have gone up or down. On what is thought to be intelligent anticipation of the Government's announcement, Home Railway stocks have enjoyed a fresh bout of strength in which Southern Railway and London Passenger Transport stocks fully participated.

Rises in Prices

Southern Railway preferred stock has jumped 4 points to 60½ and London Passenger Transport "C", which was down to 33 in January this year, is now 45½. At the latter figure, the stock would seem to be fairly fully valued, although it may be recalled that five years ago it touched 111. Things then, however, were very different from what they are now, and the likelihood of the price getting into three figures is unquestionably remote. Southern preferred stock looks worth the present figure as a speculative investment, while the company's 5 per cent. preference stock, being as it is in the trustee list, will command respectful attention so long as the Government maintains its control of the money market.

British Electric Traction deferred has risen 25 points to 875. Lancashire Transport ordinary are 2s. 6d. higher at 42s. 6d., and West Ridings 1s. up at 39s. Thomas Tillings at 46s. 3d. are ⅛ higher.

Overseas Electrical Shares

Indian shares remain in favour, and Cawnpore Electric have risen 9d. to 28s. 3d. This is 3s. a share higher than the price which the company received for 118,500 shares placed in the Stock Exchange in July. The company secured 25s. net per share, and although these new shares receive a trifle less dividend for the time being than the senior issue, the fortunate allottees of the new shares already see a very substantial profit on their transaction. Calcutta Electrics at 37s. are again 6d. higher. A fall of 2 points in Tokyo Electric 6 per cent. bonds has reduced the price to 28½, at which the yield on the money, so long as the coupons are met, comes to £21 per cent. So far, the Tokyo Electric Company has duly fulfilled its obligations, but there is no need to explain why the price has fallen to the present figure.

Equipment and Manufacturing Shares

Apart from a decline to 11s. 9d. in "Emmi" shares, all the changes in the prices of equipment and manufacturing shares quoted in our lists, are upwards. The rises range from 5s. in Lancashire Dynamo shares to 3d. in Ever-Ready. Lancashire Dynamos at 52s. 6d. were returning the handsome yield of £7 12s. 6d. per cent. on the money and upon this being noticed, a few buyers came along whose inquiries served to put up the price to 57s. 6d., allowing a return, on the last-paid 20 per cent. dividend, of a shade under 7 per cent. on the money. A gain of ⅛ in Murex raised the price to 4½. Enfield Cables are a good market at 52s. 6d., showing a florin advance after taking into account the dividend deduction. Amongst the lower-priced shares Vactric picked up to 2s. 9d. Brush remained at about 3s., at which price there are buyers. Automatic Telephone & British Aluminium have improved to the common price of 47s. 6d. Rises in Telephone Manufacturing and Telephone Rentals have advanced the prices to 7s. 9d. and 8s. respectively. British Vacuum Cleaners have come into favour, and the price is up to 8s. 3d.

Enfield Rolling Mills

After languishing in the doldrums for many months, the shares of Enfield Rolling Mills are coming into notice on account of the demand that there is nowadays for shares in companies likely to do well during the war, and to show further progress later on. The company has had a chequered career, making a loss in the three years 1935–36 inclusive, but re-entering the dividend list in 1939, when, for the fifteen months ended September 30th, a dividend of 3½ per cent. was paid on the ordinary shares. In the following twelve months, the profits showed 15 per cent. on the ordinary, and a dividend of

(*Concluded on page* 180)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Aug. 26	Rise or Fall	Yield £ s. d.
Home Electricity Companies					
Bournemouth and Poole	15	12½	51/3	+6d.	4 17 5
British Power and Light	7	6	25/–	..	4 16 0
City of London	7½	7	25/9	+9d.	5 8 9
Clyde Valley	8	8	37/6	+6d.	4 5 4
County of London	10½	8	35/–	+6d.	4 11 5
Edmundson's:					
7% Pref.	7	7	31/3	..	4 9 7
Ord.	6	6	27/–	..	4 9 0
Elec. Dis. Yorkshire	9	9	38/9	..	4 3 0
Elec. Fin. and Securities	12½	12½	42/6	..	5 17 8
Elec. Supply Corporation	11½	10	41/3	+6d.	4 17 0
Isle of Thanet	2	Nil	8/6	..	—
Lancs Light and Power	7½	7½	32/6	..	4 12 4
Llanelly Elec.	5½	5½	20/–	..	5 10 0
Lond. Assoc. Electric	5½	4½	18/9	+6d.	4 16 0
London Electric	7	7	23/9xd.	..	5 18 0
London Power Deb. Red.	5	5	104	..	4 16 2
Metropolitan	10	8	33/9	..	4 14 10
Midland Counties	8	8	37/–	..	4 6 5
Mid. Elec. Power	9	9	37/6	..	4 16 0
Newcastle Elec.	7	7	27/6	..	5 1 10
North Eastern Elec.:					
Ordinary	7	7	29/6	..	4 15 0
7% Pref.	7	7	33/3	..	4 4 2
Northampton	10	10	43/9xd.	..	4 11 5
Notting Hill 6% Pref. (£10)	6	6	8½	..	—
Northmet Power:					
Ordinary	10	7	35/–	+6d.	4 0 0
6% Pref.	6	6	29/6	..	4 1 4
Richmond Elec.	6	6	22/6	..	5 6 8
Scottish Power	8	8	37/6	+6d.	4 5 4
Southern Areas	5	5	17/6	+⅛	5 14 3
South London	7	7	23/6	..	5 19 2
West Devon	5	5	21/3	..	4 14 1
West Glos.	4½	4½	18/3	..	4 18 8
Yorkshire Elec.	8	8	38/3	..	4 4 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	2/9	+3d.	—
Calcutta Elec.	8*	7*	37/–	+6d.	3 15 9
Cawnpore Elec.	10	10	28/3	+9d.	7 1 7
East African Power	7	7	25/9	..	5 8 9
Jerusalem Elec.	7	7	18/9	..	7 9 4
Kalgoorlie (10/–)	7½	7½	12/6	..	6 0 0
Madras Elec.	6*	4*	23/–	..	3 9 7
Montreal Power	1½	1½	24½	..	6 2 5
Palestine Elec. "A"	Nil	Nil	18/3	..	—
Perak Hydro-elec.	2½	6	17/6	..	6 17 2
Shawinigan Power	83cts.	90cts.	14½	..	—
Tokyo Elec. 6%	6	6	28½	–2	21 1 0
Victoria Falls Power	15	15	78/9	+⅛	3 16 2
Whitehall Inv. Pref.	7½	7½	13/9	..	10 18 2

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Aug. 26	Rise or Fall	Yield £ s. d.
Public Boards					
Central Electricity:					
1950–70	5	5	110	..	4 11 1
1955–75	5	5	114	+1	4 7 9
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	100½	..	3 9 8
1974–94	3½	3½	94	..	3 9 2
London Elec. Trans. Ltd.	2½	2½	94	..	2 13 2
London & Home Counties 1955–75	4½	4½	106½	..	4 4 6
Lond. Pass. Trans.:					
A	4½	4½	113½	..	3 19 4
B	5	5	109½	..	4 11 4
C	1½	3	45½	+4	6 11 10
West Midlands J.E.A. 1948–68	5	5	108½	..	4 12 0
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	107½	..	5 11 9
Def.	1½	1½	24½	..	6 2 5
Anglo-Portuguese	8	8	15/–	..	10 13 4
Cable & Wireless:					
5½% Pref.	4½	5½	103	–½	5 6 10
Ord.	4	4	62	–1½	6 9 0
Canadian Marconi	$1 Nil	4cts.	6/3	..	3 5 0
Globe Tel. & Tel.:					
Ord.	8½*	8½*	28/9	..	—
Pref.	6	6	27/6	..	4 7 3
Great Northern Tel. (£10)	20	20	12½	..	—
Inter. Tel. & Tel.	Nil	Nil	3	..	—
Marconi-Marine	7½	7½	26/3	..	5 14 3
Oriental Tel. Ord.	11½*	16	3½	+½	4 18 6
Telephone Props.	6	6	11/3	..	10 13 4
Tele. Rentals (5/–)	10	10	8/–	+9d.	6 5 0
Traction and Transport					
Anglo. Arg. Trams:					
First Pref. (£5)	Nil	Nil	2/–	..	—
4% Inc.	Nil	Nil	4½	..	—
Brit. Elec. Traction:					
Def. Ord.	45	45	875	+25	5 2 8
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8*	8	41/3	..	3 17 8
Brazil Traction	$1	50c.	8¾	..	—
Calcutta Trams	8	5½	23/9	..	4 12 7
Cape Elec. Trams	5	5	17/–	..	5 17 4
Lancs Transport	10	10	42/6	+½	4 14 1
Mexican Light:					
1st Bonds	5	5	45	..	—
Rio 5% Bonds	5	5	85	..	5 17 8
Southern Rly.:					
5% Prefd.	5	5	60½	+4	8 5 4
5% Pref.	5	5	96½	..	5 3 7
T. Tilling	10	10	46/3	+⅛	4 6 7
Tilling & B.A.	8*	7*	52/6	..	2 13 4
West Riding	10	10	39/–	+1/-	5 2 7

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939-40	Dividend 1940-41	Middle Price Aug. 26	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron Elec. Ord. ..	Nil	7½	20/6	+6d.	7 6 4
Assoc. Elec. :					
Ord.	10	10	42/6	..	4 14 3
Pref.	8	8	36/3	..	4 8 5
Automatic Tel. & El.	12½	12½	47/6	+⅛	5 5 3
Babcock & Wilcox	11	11	45/9	+9d.	4 16 1
British Aluminium .	12½	10	47/6	+6d.	4 4 1
British Insul. Ord. .	20	20	87/6	..	4 11 4
British Thermostat (5/-)	18½	18½	12/6	..	7 8 0
British Vac. Cleaner (5/-)	40	12½	8/3	+2/-	7 11 6
Brush Ord. ..	Nil	Nil	3/-	..	—
Callender's ..	15	15	67/6	..	4 9 0
Chloride Elec. Storage	15	15	65/-	+½	4 12 4
Consolidated Signal	17	17	72/6	+⅛	4 13 10
Crabtree (10/-) ..	17½	17½	26/3	..	6 13 4
Crompton Parkinson Ord. (5/-) ..	30	20	19/6	..	5 2 8
E. K. Cole (5/-) ..	10	Nil	6/6	..	—
E.M.I. (10/-) ..	5	Nil	11/9	-3d.	—
Electric Construction	10½	10	32/6	..	6 3 0
Enfield Cable Ord.	16½	12½	52/6xd.	+2/-	4 15 3
Elecl. Switchgear (10/-)	16	10	20/-	..	5 0 0
English Electric ..	10	10	35/-	..	5 14 2
Ensign Lamps (5/-)	25	25	16/3	..	7 13 10
Ericsson Tel. (5/-)..	25*	22*	37/6	..	2 18 8
Ever Ready (5/-) ..	40	40	28/3	+3d.	7 1 7
Falk Stadelmann ..	7	7½	17/6	..	8 11 6
Ferranti Pref. ..	7	7	26/3	..	5 6 10
G.E.C. :					
Pref.	6½	6½	32/6	..	4 0 0
Ord.	20	17½	80/-	..	4 7 6
Greenwood & Batley	15	13	22/6	..	11 11 2
Hall Telephone(10/-)	15	10	13/9	..	7 5 6
Henley's (5/-) ..	20	20	21/3	..	4 14 1
4½% Pref. ..	4½	4½	21/3xd.	..	4 4 8
Hopkinsons ..	15	15	45/9	..	6 11 0
India-Rubber Pref.	5½	5½	21/3	..	5 3 6
Intl. Combustion ..	32½	30	105/-	..	5 14 3
J. Lucas	15	15	60/-	..	5 0 0
Johnson & Phillips	15	15	51/3	..	5 18 10
Lancashire Dynamo	20	20	57/6	+½	6 19 0
Laurence, Scott (5/-)	15	15	10/9	..	6 19 6
London Elec. Wire	7½	7½	22/6	..	6 13 4
Mather & Platt ..	13½	10	43/9	+6d.	4 12 6
Metropolitan Elec. Cable Pref. ..	5½	5½	21/3	..	5 3 6
Murex	20	20	90/-	..	4 9 0
Pye Deferred (5/-)	25	25	13/9	..	9 1 10
Revo (10/-) ..	5	20	23/9	..	8 8 5
Reyrolle	12½	12½	55/-	..	4 10 3
Siemens Ord. ..	7½	7½	25/-	..	6 0 0
Strand Elec. (5/-)..	4	2	2/-	..	5 0 0
S. Smith (1/-) ..	37½	50	7/6	..	6 13 4
Switchgear & Cowans (5/-) ..	10	15	8/9	..	8 11 6
Tel. Condenser (10/-)	Nil	5	11/3	..	4 9 0
T.C. & M.	10	10	40/-	..	5 0 0
Telephone Mfg. (5/-)	9	9	7/9	+6d.	5 16 2
Tube Investments..	23¾	23¾	95/-	..	5 0 0
Vactric (5/-) ..	4	Nil	2/9	+3d.	—
Vickers (10/-) ..	10	10	16/3	..	6 3 1
Ward & Goldstone (5/-)	20	20	16/6	..	5 19 9
Westinghouse Brake	17½	10	46/3	+⅛	4 6 4
Walsall Conduits (4/-)	55	55	31/3	..	7 0 9
West, Allen (5/-) ..	7½	7½	3/9	..	10 0 0

* Dividends are paid free of Income Tax.

Stocks and Shares (*Concluded from page* 178)

2½ per cent. was declared. The company was originally formed to manufacture copper rod. Since then, its activities have been greatly extended. The issued share capital is £560,000 in shares of £1 each, which stand at 13s. There is an outstanding debenture issue of £186,860.

Brakes & Signals

Consolidated Signal shares at 72s. 6d. are ⅛ higher and Westinghouse Brake shares have strengthened to 46s. 3d. The movements are, of course, complementary. The Consolidated Signal Company derives its income from its holding of Westinghouse Brake shares and thus its dividend is entirely dependent upon that of the latter company. When Westinghouse Brake pays 10 per cent., as it does at present, Consolidated Signal automatically declares 17 per cent. At 72s. 6d., the current price, Signals pay £4 13s. 10d. per cent. on the money, whereas Westinghouse Brakes at 46s. 3d. give £4 6s. 4d. In theory, therefore, Consolidated Signal shares stand relatively too low, and the rise of ⅛ in the price is a step towards equalising the position.

Notwithstanding the demand that there is nowadays for investments and speculative investments of all kinds, Cable and Wireless stocks fail to attract attention. The ordinary stock has an occasional rise, but this seems to bring in sellers and at 62, the present price, the stock is 1½ down on the week. The preference is also easier at 103. Other communication shares are steady. Orientals are 2s. 6d. higher at 65s. The Anglo-American stocks hold their recent improvements.

Reserves or Dividends ?

Post-war considerations are being closely studied by companies engaged in all kinds of industrial business and different boards adopt a different policy as they endeavour to visualise what is likely to happen after the war. A sound plan, which certain of the electrical manufacturing and equipment companies follow, is directed towards the building-up of as much reserve as possible. Present-day taxation takes so heavy a toll of profits that the provision for reserves is often less than a board would desire to make. In cases where the alternative is either distribution up to the hilt or reservation of substantial sums of money for post-war purposes, the choice usually seems to be the second.

Financial Section (*Continued from page* 177)

tention to appear must be sent to A. Kramer & Co., 49, Queen Victoria Street, E.C.4., by October 18th.

Liquidations

G. A. Brittain (Radio), Ltd.—Winding up voluntarily. Liquidator, Mr. A. H. Walkey, of Cooper & Kenny, 34, Dame Street, Dublin, to whom particulars of claims should be sent by October 15th.

McHales Radio, Ltd.—Meetings, September 30th, at the offices of Poppleton & Appleby, King Edward House, New Street, Birmingham, 2, to hear an account of the winding-up from the liquidator, Mr. F. E. Bendall.

Howard Smith (Electrical Engineers), Ltd.—Winding up voluntarily. Liquidator, Mr. J. M. Howard, 3, Abchurch Yard, London, E.C.4.

Herts Radioelectric, Ltd.—Meetings, September 23rd, at the offices of A. E. Attwood & Co., 90, Queen Street, Cheapside, E.C.4., to hear an account of the winding-up from the liquidator, Mr. A. E. Attwood.

Electric Vehicle Association

Annual Meeting and Report

THE annual general meeting of the Electric Vehicle Association of Great Britain, Ltd., a report of which we have just received, was held on May 27th, when Sir Felix Pole was re-elected president of the Association, Mr. A. W. Barham chairman, and Mr. A. J. Fippard vice-chairman.

At a meeting of the Executive Committee which followed, it was decided to form a Standardisation Sub-committee to consider the question of standardisation of the electric battery vehicle. The Manufacturers' Sub-committee, which includes all manufacturer members of the Association, was re-elected and is dealing with the questions of allocations of material for both new vehicles and those at present in use. The Publicity and Exhibition Sub-committee was also re-elected, Mr. R. Birt (Ealing) and Mr. A. H. Young (Edmundson's) being nominated to fill two vacancies.

Annual Report

The annual report of the Association for the year ended December 31st, 1940, states that the year ended with excellent prospects for the electric vehicle, but owing to the imposition of material rationing and changed conditions during the year, earlier hopes for a continuous expansion of the industry have not been fulfilled. Three more manufacturers have become members and one member who had resigned in the previous year has been re-elected. There has been one resignation of a distributor, as the firm has ceased business in electric vehicles.

The Vehicle Manufacturers' Sub-committee has made several important recommendations during the year. These include the following:—That a deputation should attend on the Minister of Transport pressing for a "global" allocation of materials for an annual output of 7,500 vehicles; the basis upon which materials should be allocated; and that a comprehensive exhibition policy should be adopted, including exhibitions at a number of important centres throughout the country.

Owing to the war there has been considerably less scope for the activities of Area Committees, whose function in arranging exhibitions and similar work has been taken over by the Association. E.D.A. Area officers have continued to act as Area secretaries. The fourth annual Manchester exhibition was held on February 21st and similar exhibitions were held during the year in London, Cardiff, Leeds, Glasgow, and Birmingham, while further exhibitions were in prospect for Sheffield, Hull and London, but these were abandoned owing to the situation with regard to materials. A campaign in conjunction with E.D.A. for advertising in selected trade journals was begun in February, but owing to the restrictions on materials combined with the coming into force of the Purchase and Acquisition Order the campaign was concluded in September.

Special representations have been made to the Minister of Transport which culminated, in February, with a deputation being received by the Ministry when the importance of the electric vehicle industry to the economy of the country was stressed. As a result the Association has been designated by the Ministry to handle the allocation of materials for the whole of the industry, whether members or non-members of the Association.

Considerable work has been undertaken in ascertaining the requirements of the industry for materials and in finding a basis of allocation which would be satisfactory to all manufacturers. Such a basis was adopted, but owing to the shortage of materials which developed in May and June of the year under review, materials have only been available for spares and maintenance work. It is hoped, however, that some materials will be available for new vehicles at an early date.

An Electric Vehicle Export Group has been formed, the secretarial and technical duties of which have been undertaken by the Association and with the assistance of E.D.A. without cost to members of the Group.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Bideford.—September 9th. Town Council Refrigerator for British Restaurant. (See this issue.)

Brighouse.—August 30th. Electricity Committee. 300-kVA transformer and switchgear. (August 8th.)

Dewsbury.—September 23rd. Corporation. Reactor and voltage regulator. (See this issue.)

Glasgow.—Gas Committee. New conveyor to replace an electrically driven portable pitch conveyor (capacity 60 tons per hour). Also various materials, including an electrically driven travelling hopper and coke riddle.

New Zealand.—AUCKLAND HARBOUR BOARD.—September 30th. Ten 5-ton electric cranes.

Salford.—September 17th. City Council. Three-phase oil-immersed power transformers. (See this issue.)

South Africa.—SALISBURY (S. RHODESIA).—September 29th. Two 2,500-kW turbo-alternators and exciters with complete condensing and auxiliary plant. (August 15th.)

October 13th. City Council. Water tube boilers and other plant. (See this issue.)

October 27th. Switchgear, transformers, reactors and auxiliary apparatus. (See this issue.)

Sunderland.—September 15th. Education Authority. Wiring for electric lighting installations in school air-raid shelters. (See this issue.)

Warrington.—September 1st. Electricity Department. Cables, earthenware conduits, slabs, tiles and covers. (August 8th.)

Orders Placed

Glasgow. — Health Committee. Accepted Cold chamber at Caldwell House Institution (£171).—J. & E. Hall.

Health Committee. Accepted. Overhauling goods hoist (£422).—Waygood-Otis.

Police Committee. Accepted. Refrigerator in the canteen at police headquarters (£238).—J. & E. Hall.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashton-under-Lyne.—Weights and Measures office; A. T. Kemp, Town Hall, Ashton-under-Lyne.

Bedale.—Hostel for the Ministry of Agriculture at Leeming Bar.

Billingham - on - Tees. — Additional canteen accommodation at A.R.P. hostel; J. H. Hill, U.D.C. surveyor.

Blyth.—Adaptation of premises as British Restaurants and emergency feeding centres; T. Wilson, borough engineer.

Corby.—Junior and infants' school; Rev. Fr. R. E. Underwood, Church of Our Lady of Walsingham, Corby, near Kettering.

Coventry.—Hospital block; S. C. Hill, hospital house governor, Stoney Stanton Road, Coventry.

Darlington.—Office extensions, Neasham Street; Thomas Rodgers, builder, Valley Street, Darlington.

Additions, John Street; W. S. Hutton, Ltd., builders, Post House Wynd, Darlington.

Dartford.—Kitchen and shelters; J. C. Beadle, Ltd.

Doncaster.—Communal feeding centre and kitchen, Sandall Park; R. E. Ford, borough estates surveyor, 3, Priory Place, Doncaster

Durham.—Canteens at secondary schools (£13,400); county architect.

Falkirk.—Renovation of Ritz Cinema for Camelon Picture House Co; the manager.

Hawarden.—Fire station, for R.D.C.; E. J. Reidford, surveyor, Council Offices, Hawarden, near Chester.

Hexham.—Hostel; E. Jeffcock, builder, Walbottle Road, Newburn-on-Tyne.

Kettering.—Additions to nurses' home, for Joint Hospital Board; Blackwell & Storry, architects, Gold Street Chambers, Kettering.

Kidderminster.—Adaptation of the Salvation Army Citadel for British Restaurant; J. Hawcroft, borough surveyor, Mill Street, Kidderminster.

Lancashire.—Police station at Huyton and remand home at Boothstown (£1,565); county architect.

Leeds.—Conversion of more premises for additional British Restaurants; W. S. Cameron, city engineer, The Civic House, Leeds.

London. — FULHAM. — Shelter improvements (£30,000); borough engineer.

Middlesbrough.—British Restaurants in Newport Road and at the Butchers' Market Hall for the Town Council.

Newcastle - on - Tyne. — Community feeding centres; F. Harvey, Education Offices, Northumberland Road, Newcastle.

Rebuilding the Goat Inn, Westgate Road, Newcastle; Hetherington & Wilson, architects County Chambers, Newcastle.

Rochdale.—British Restaurant, in Back Oldham Road; R. & T. Howarth, Ltd., builders, Crosfield Works, Rochdale.